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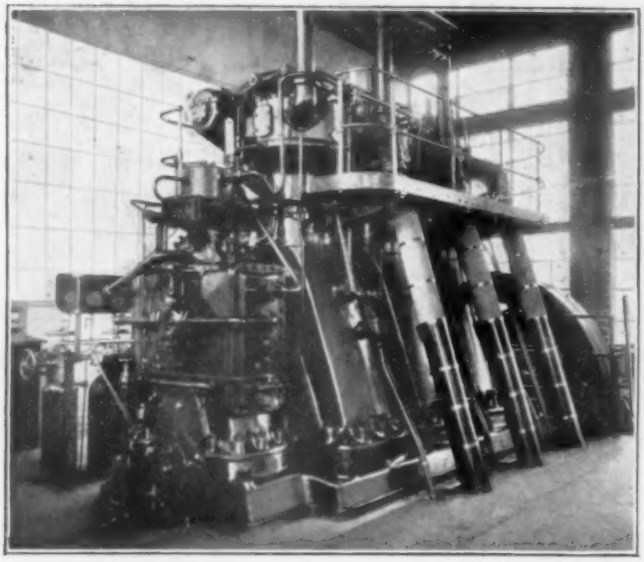

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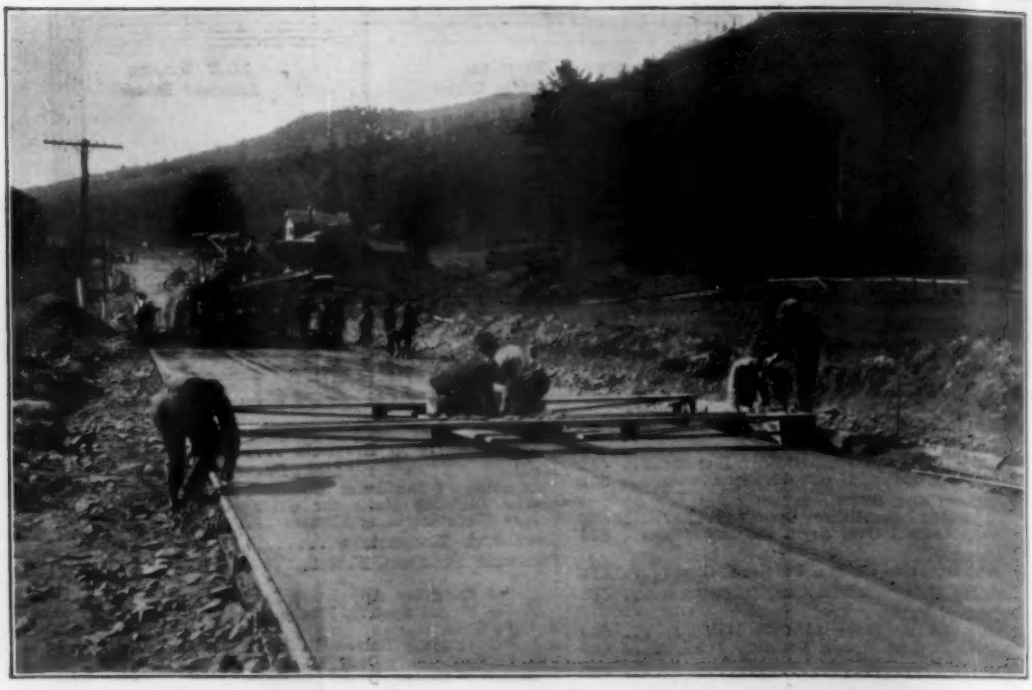

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Vol. XXXV
No. 4

The American City Magazine

OCTOBER
1926

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To Park or Not to Park

An Attempt to Formulate a Statement of Principles, Applicable to All Cities, for the Parking and Storage of Automobiles and the Facilitation of Street Traffic and Transportation

OUT of the welter of conflicting ideas and interests affecting the parking of automobiles on congested streets, it is obviously desirable that there should be formulated, as soon as may be, a set of principles as an aid to intelligent planning by municipal officials and local business men.

Must our expanding cities look forward to constantly growing expenditures of staggering amounts for street widenings, sidewalk arcades, elevated and underground traffic ways, and other devices for permitting more and more automobiles to move—and park—in downtown business streets?

On the other hand, can our progressive business men no longer build big retail shops, theaters and other structures where the crowds congregate, with reasonable expectation that the city will somehow make it possible for their customers to continue to arrive—and park—by automobile?

In behalf of rational city planning and sound municipal finance, THE AMERICAN CITY suggests, as a basis for local action, this statement of principles:

1. That streets are primarily provided for general public use as lines of communication for pedestrians and for the transportation of persons and merchandise; and that the rights of the different classes of traffic to unlimited use of the streets, including the right to park, are subject to the public and civic welfare.

2. That unlimited parking be allowed at all times in all business districts where it does not cost the traveling public more than it saves those who park, nor interfere with the expeditious movement and safety of street traffic, and with reasonable access of vehicles to the curb.

3. That as vehicular traffic density increases, every reasonable effort be made to expedite movement and make it more safe, by the use of pavement markings, traffic signs and signals, the designation of one-way and "through" streets, the employment of adequately trained traffic officers, and other aids to traffic safety and facilitation; and that traffic ordinances and parking regulations give recognition to the manifold interests represented by public transportation vehicles.

4. That the right to

The Collaborators

The accompanying statement is an elaboration of a draft recently prepared by the editor of The American City and submitted for criticism to a group of consultants in street traffic and transportation problems. Comments and valuable suggestions were received from George B. Ford, E. P. Goodrich, Robert Whitten, Lawson Purdy, and The Beeler Organization, New York; Harland Bartholomew, St. Louis; Miller McClintock, The Erskine Bureau, Harvard University; J. Rowland Bibbins, Washington, D. C.; Walter Jackson, Mt. Vernon, N. Y.; Delos F. Wilcox, Grand Rapids, Mich.; Sidney J. Williams, of Chicago, Director, Public Safety Division, National Safety Council; and the Domestic Commerce Division, Department of Commerce, Washington, D. C. In its present form the document is believed to meet with the approval of all of these specialists, except as indicated in the comments which follow the general statement.

move a car is superior to the right to *store* a car on the public ways, and that when or where parking causes a net economic loss to the public through hindrance to safe and convenient travel, there should be limitation—or in extreme cases, at certain hours, total abolition—of parking, both commercial and private; and that in some cities the complete prohibition during certain hours of private motor and horse-drawn vehicles from congested downtown districts, and limitation of commercial vehicles to consolidated service, is to be regarded as an ultimate possibility.

5. That if the active and impartial enforcement of such regulations—and the alternative of intolerable congestion in the streets—are considered by business men to be to the disadvantage of business in certain districts, an attempt be made to solve the problem by one or more of three methods:

(a) By the provision or improvement of by-pass routes for through traffic, if congestion on the downtown streets is due in a considerable degree to traffic which has no need to be in the district under consideration; such by-pass routes to be designed, wherever economically justifiable, with separated grades to permit uninterrupted flow of traffic;

(b) By the provision of storage garages or other off-the-street parking and loading facilities on private property, by the business interests affected, at their own expense, and with a low rate of charge to their customers;

(c) By the widening, arcading, or double-decking of existing downtown streets—*to only such an extent, however, as property owners on these streets are willing to pay, by benefit assessments (payable over a period of years) for so much of the land and construction costs as may be for their benefit;* the principle being recognized that if the city as a whole were required to pay the cost of congested-district street widening, arcading or double-decking, the building of by-pass routes would ordinarily be a much wiser expenditure of municipal funds.

6. All future department stores, theaters, tall office buildings, and other business structures catering to large numbers of customers or tenants should be built, therefore, only with a knowledge by the owner that he must either provide space himself for loading and unloading of merchandise and for storage of his customers', tenants', and employees' cars; or depend on the trade and services of persons who travel by foot or public conveyance; or establish branch shops, banks, neighborhood theaters, etc., outside of the congested centers, in areas properly zoned and so planned that there will be free circulation with ample parking space and a segregation of trucking and delivery by means of alleys or otherwise.

The foregoing statement of principles is based on the growing body of opinion, among city planners and municipal administrators, that congestion in the business centers of our great cities is a malady which cannot be cured by providing facilities for greater congestion; that, in the public interest, every city must consider a deliberate policy of decentralization and the adoption of a plan for major street and transit developments with a fair division of cost between the city and the benefited property; and that thereafter projects primarily of local interest must be locally financed.

Comments on the Foregoing Statement

Relation of Downtown Business Interests to the Parking Problem

I heartily agree with the statement of principles as contained in paragraphs 1, 2, 3, and 4. In paragraphs 5 and 6, however, I believe there is an over-emphasis of the relation of the downtown business interests to the parking problem. The main consideration should be that of maximum service and convenience to all those who use the streets for a legitimate transportation purpose. This same mistake of emphasis is often made in discussing street-car service. The routing of cars is discussed with reference to advantage or disadvantage to the large stores rather than with reference to the convenience of the car rider.

It is to the interest of the public that adequate facilities be provided for each type of street transportation (private automobile, taxicab, street car, or bus) so that each agency will be able to supply that kind of service that it is best adapted to furnish. The private automobile is in most cities performing a highly important function. It is transporting people on numerous business and social trips with an advantage in time and convenience that cannot be approached, within its special field, by any other agency. Reasonable opportunity for short-time stops is, of course, essential to the use of the private automobile in this way. Such use in most cities is so general that it becomes a matter of public convenience and necessity, not merely that of its effect on the business interests.

Reasonable parking privileges are of direct advantage to automobile owners generally and they should be called upon in largest measure to defray the cost of all improved traffic facilities, including the provision of reasonable facilities for short-time stops. Through registration fees and gasoline taxes the automobile users are building the state highways. They will have to stand still

heavier burdens in order to cope with increasing congestion in the cities. It is decidedly to their interest to do this as otherwise the large investment that they now have in private cars will become useless. The problem for most cities is not insuperable. The construction of by-pass express roads and the creation of necessary parking facilities can be justified by the direct economic advantage to the users of these facilities.

ROBERT WHITTEN,
City Planning Consultant, New York.

Double Parking and Parking Opposite Loading Zones

I agree in every particular with your statement on the parking problem. My only additional comment is this:

While recognizing that this statement cannot deal with details, I feel that perhaps special attention should be directed to the evils of double parking and parking opposite a loading zone on a street of ordinary width where such practice either interferes with the movement of traffic, or leads drivers to drive through the loading zone. Under "parking" I mean here to include even the most temporary stopping of a vehicle to load or unload passengers or goods. Not only should double parking, and parking opposite or near a loading zone, be strictly prohibited, but any tendency to such parking should be taken to indicate that the parking restrictions in that block should be made more strict, so that there will always be room at the curb to stop for the loading and unloading of passengers or material.

SIDNEY J. WILLIAMS,
Director, Public Safety Division, National Safety Council. Chicago.

Why Give the Streets Away When Public Transport Is Available?

Your inquiry and statement of principles on "To Park or Not to Park" are significant indeed as coming from a magazine devoted to the municipal point of view. Without economic astigmatism to distort your vision, you see that the personal automobile, like Aaron's serpent, threatens to swallow all the brains, time and revenue at the disposal of our city officials in its effort to spread as unrestrainedly as rabbits in Australia or English sparrows in America.

It is good to see that the absurdity of charging nothing for the occupancy of the most valuable realty in town, and narrowing the highways to boot, is being appreciated by others than transportation men whose business is at stake. There is such a state as having "too much of a good thing"; and that's the case with unlimited stabling of automobiles on highways intended for moving vehicles.

To appreciate the extent to which the parked automobile has become a parasite on the streets, consider the howl of execration that goes up if a trolley car is parked on a siding! One of my clients spent many thousands of dollars to comply with public clamor against a maximum layover of 3 minutes on the very same block where two score automobiles were and still are parked all day long.

The personal machine uses up so much of the street area in proportion to its passengers that those who simply must enjoy such exclusiveness ought to pay for it in the form of garage fees. Merchants who encourage parking are surely short-sighted. Not more than two or three autos bringing hardly six customers will block off the view of their show windows from pedestrians on the opposite side and from persons riding by. On the other hand, one trolley car or bus will deposit twenty customers at their doors every few minutes and not linger a second longer than the interchange of passengers requires. Only the public utility transport vehicle leaves the merchant's curbs free for loading and unloading his goods.

Nor is it fair that merchants who garage their customers' cars should recoup themselves from the rest of their patrons. I will venture to guess that the usual automobile customer pays when she likes while most of the others are of the cash variety, which adds to the unfairness of it all.

Your suggestion that downtown streets be widened, arcaded or double-decked only at the expense of the property owners affected brings the whole question down to bed-rock. Hold fast to this principle and you will hear a lot less talk about grandiose schemes. It makes a difference whether the bill is paid by those who expect to be benefited or by the masses at large. In my own line of effort I notice a considerable cooling down of enthusiasm for subways in "up and coming" towns when it is suggested that the cost be met by assessments based on the degree of benefit anticipated.

Somewhere, the shade of Henry George must be enjoying a broad smile.

WALTER JACKSON,
Fare and Bus Consultant, Mt. Vernon, N. Y.

Consolidated Delivery Service—Storage Garages—Decentralization

You are to be sincerely congratulated for your idea of formulating a statement of principles which will help to bring order out of chaos in the streets of our cities. All of us, individually or en masse, can do better work if we have a concrete ideal to aim at, and the principles which you have formulated strike me as being worthy of such classification.

There are, however, three statements in which I can not concur. In paragraph 4, "limitation of commercial vehicles to consolidated service" is regarded as an ultimate possibility. It strikes me that this is an anticipated move of questionable desirability. My objection is not that consolidated delivery service is bad, but that we know so little about the success or failure of such ventures that we are not now in a fair position to recommend such action for general adoption. Consolidated service has done well in some cities and has failed dismally in others. Some individual concerns have adopted the idea gladly, and others have fought the idea bitterly. In short, consolidated service has not been and is not looked upon everywhere as a 100 per cent solution for taking commercial vehicles off the streets, or even for efficiently performing the necessary delivery functions. Until it is proved to be more of a general solution both for economical service and for aiding traffic than it has up to the present time, I doubt the advisability of recommending it for general acceptance.

Secondly, paragraph 5 (b) suggests an attempt to solve the parking problem to meet the interests of business men "by the provision of storage garages or other off-the-street parking and loading facilities on private property, by the business interests affected, at their own expense....." It seems a dubious policy to recommend universally that business interests finance, build and carry at their own expense storage garages for customers

and for their own automobiles. Opinions in the retail field of the benefits derived from such facilities strongly differ. I can not approve the inclusion of such a mandatory provision in your recommendations.

Thirdly, in the final paragraph, your statement that "every city must consider a deliberate policy of decentralization," is again of such breadth that I can not subscribe to it. In the study made by this Division and published as "Vehicular Traffic Congestion and Retail Business," it was found that only the large cities are decentralizing and that the smaller and many of the medium-sized cities are still centralizing and will continue to do so for many years to come. In the latter cases, such a movement was for the most part distinctly to the advantage of these municipalities. It is doubtful if many of them will grow to the point where they should ever adopt a scheme of decentralization. That being the case, I do not believe it is wise to force them to consider such action at probably considerable expense.

A. HEATH ONTHANK,
Chief, Domestic Commerce Division, U. S. Department of Commerce.

California Municipal Traffic League Calls State-wide Conference on Uniform Traffic Regulations

TO promote the public welfare by securing uniformity in the adoption and enforcement of traffic laws and regulations, and to promote public safety in the use of the highways are the chief purposes of the California Municipal Traffic League, which has called a state-wide conference to meet in Fresno, November 18-20.

At its organization meeting in San Francisco, July 16, the League endorsed a draft of a uniform traffic ordinance* prepared by the legal departments of the California State Automobile Association and the Automobile Club of Southern California in conjunction with Miller McClintock, traffic advisor, for San Francisco, Los Angeles and Chicago. The purposes of the League and the proposition of uniform traffic regulations were approved by the League of California Municipalities, at its annual convention in August, in a resolution urging all municipalities "to send representatives to the proposed meeting at Fresno for the purpose of assisting in the preparation and adoption of such uniform traffic regulations."

Membership eligibility in the California Municipal Traffic League is defined in its articles of association as follows:

"All public officers of California, state, county or municipal, whose duties relate to the making or enforcing of traffic laws, rules or regulations, also all organizations so interested, shall be eligible to membership in the association; provided each private organization belonging shall not be entitled to have more than one representative or one vote; provided further, that no organization engaged in the manufacture or sale for profit of devices or signals for regulating traffic shall be eligible to membership."

The officers are: President, C. F. Todd, San Francisco; First Vice-President, Frank Shaw, Los Angeles; 2nd Vice-President, W. B. Hogan, Stockton; 3rd Vice-President, J. P. Murphy, Fresno; Corresponding Secretary, Capt. H. Gleeson, San Francisco; Secretary, Wm. J. Locke, Alameda; Treasurer, C. J. Gardner, San Rafael.

* See THE AMERICAN CITY for September, 1926, pages 407-415.

Country Fires Should Not Be Dependent on City Apparatus

ONE of the questions that is causing many of the small towns and some of the cities considerable trouble is that of handling the calls for assistance with their motor fire equipment outside the town and even in adjoining towns. It is the almost universal custom in this country for everyone to assist in every way possible in the case of a fire, but at the same time the first responsibility of municipal officers is to give their own taxpayers fire protection and it is very doubtful if any town should allow its fire-fighting equipment to go a long way in the country, thereby leaving the property in town with no fire protection.

In a constantly growing number of cities and towns in the state the fire equipment belonging to the municipality is not allowed to go into the country, and the adjoining townships are trying to figure some way in which they can finance a fire truck to be used in country fires, to be kept at some central place and to be called on in every case of a fire in the country. This is the real solution of the problem. A fire truck suitable for country fires must be equipped with a pumper, but in most small cities and towns pumper equipment is not necessary on a fire truck to be used exclusively in towns. For fighting town fires, especially where there is a water system, the best equipment is chemical tanks or booster tanks with plenty of fire hose. For fighting a country fire there is, of course, no water pressure and a pump is absolutely necessary for any satisfactory results.

The fire insurance companies have not as yet taken any action in regard to fire-fighting equipment going into the country, but when it is remembered that the rates for fire insurance are somewhat based on the fact that a town has suitable fire-fighting equipment, it would seem no more than reasonable that the fire insurance rating bureau would insist on the equipment being kept in the town and ready to fight any fires that might happen.

In some towns the councils have provided that wherever the fire equipment is called into the country a charge will be made for the same, but this is not the real solution of the problem.

Townships should be given the right to enter cooperative fire districts and to levy a tax for fire protection.

From the annual report submitted at the recent annual convention of the League of Iowa Municipalities by its Secretary-Treasurer, Frank G. Pierce, of Marshalltown.

Grade Crossings Reap Their Deadly Harvest

A FAMILY OF FIVE WERE KILLED ON SEPTEMBER 3, AT WOODSIDE, OHIO, WHEN A FAST TRAIN STRUCK THEIR AUTOMOBILE

P and A Photos

ONE PASSENGER WAS KILLED AND ANOTHER INJURED RECENTLY, WHEN THIS BUS STALLED ON A RAILROAD CROSSING NEAR WATERTOWN, N. Y., AND WAS STRUCK BY AN ENGINE

Worth-While Accomplishments of Local Fire Prevention Committees

Practical Results of Campaigns Backed by City Officials, Chambers of Commerce, Newspapers, and Other Civic Forces

By Percy Bugbee

Field Engineer, National Fire Protection Association

THE National Fire Protection Association is conducting an intensive nation-wide campaign to reduce the fire waste in the United States and Canada through the organization of local fire prevention committees. Suggestions for the organization of these committees were contained in an article in THE AMERICAN CITY for February, 1926.

It is the purpose of this article to outline the accomplishments of some of these committees in order to show the very definite and constructive opportunities in work of this character.

The campaigns carried on for several years in Cincinnati and Indianapolis have already received widespread publicity. In both of these cities persistent and effective fire prevention effort has brought tangible result in reduced fire losses. Cincinnati enjoys a very low fire insurance rate as compared with other large cities. Indianapolis is now striving to be, and stands a good chance of becoming, the first city in the United States to receive a Class One grading by the National Board of Fire Underwriters.

Dallas, Texas

Dallas has had a bad fire record for the past several years, but the city is now thoroughly aroused to the seriousness of the situation and is taking active steps to improve its condition.

In October, 1925, a fire prevention bureau was created in the fire department, with four permanent men. This bureau has already proved of much value in removing fire hazards. A salvage corps has been created to reduce loss from water, exposure, etc.

On April 23, 1926, the following ordinance was adopted:

AN ORDINANCE CREATING A COMMISSION TO BE KNOWN AS THE DALLAS FIRE PREVENTION COUNCIL, PRESCRIBING ITS DUTIES, FIXING ITS TENURE OF OFFICE, AND DECLARING AN EMERGENCY

Whereas, on account of the great number of fires that have occurred and the consequent loss and waste of property, all of which appear to be largely traceable to negligence on the part of the occupant or owner of premises, and in some cases the general public, in neglecting to adopt and observe proper precautionary measures to avoid and prevent such fires, it is deemed advisable by the Board of Commissioners to appoint the hereinafter named persons for the purpose of adopting suitable measures, from time to time, to be observed by the general public and to stimulate a greater and keener interest on the part of the owners or occupants of premises in keeping their premises free from those causes which usually create fire conditions, or that are likely to create hazards of conflagration. Now, therefore,

Be it ordained by the Board of Commissioners of the city of Dallas:

Section 1. That there be, and is hereby created, a Board to be known as the Dallas Fire Prevention Council, which Board shall be composed of the hereinafter named number of persons to be appointed by the Mayor and approved by the Board of Commissioners, provided, however, that said Board shall hold their tenure of office at the pleasure of the Mayor and that they shall serve without compensation.

Section 2. That the said Board shall, upon their first meeting, elect from their own body a president and vice-president and such other representatives as they choose and shall hold their meetings at such time as they decide upon, provided they shall meet on the call of the president or vice-president, or such other officers, at special meetings from time to time.

Section 3. Said Board shall adopt such rules and promulgate such orders, in connection with prevention of fires, that may be deemed proper and suitable. That the said Board shall seek to bring about the widest dissemination of knowledge concerning the best means of preventing fire, and what is deemed to be the most precautionary measures to be adopted for such purpose. That the said Board shall stimulate among the citizens, in connection with other fire prevention committees or other civic organizations, as well as among the schools of the city, a keen and awakening interest in the observation of proper and suitable rules seeking to prevent the causes of fire and to avoid the same. That the said Board shall exercise all the power necessary and adopt all the means deemed proper in the carrying on of the campaign of education along the lines of fire prevention. That the said Board shall advise the Mayor and Board of Commissioners from time to time, concerning general conditions, as well as from time to time make special reports to the Mayor whenever demanded, regarding the particular causes of any fire or fires, and recommend such suitable measures as may be legally adopted to aid and assist in the prevention or recurrence of same.

Section 4. Said Board shall be composed of 15 members, which membership shall include the Commissioner of Fire and Police, Chief of Police, Chief of Fire Department and Fire Marshal, each of whom shall be ex officio members of the said Board.

Section 5. *Whereas*, because of the general good that the creation of the Board looking to fire prevention will have in aid of preventing fires and loss of property it creates an urgency and emergency in behalf of the immediate preservation of public peace, health and safety that requires this ordinance to become effective at once, it is accordingly so ordained that this ordinance shall be in effect from and after the passage.

A new building code is now being drawn up and will be adopted shortly. The newspapers of Dallas have been a potent force in putting these matters before the public and securing sentiment for needed improvements. An improvement in the fire record in Dallas can be predicted with reasonable certainty.

AN ILLUSTRATION USED BY THE SPRINGFIELD, MASS., FIRE DEPARTMENT IN A BULLETIN ON THE DANGERS OF THE WOODEN BARREL, DISTRIBUTED TO HOME OWNERS

Springfield, Mass.

The fire prevention division of the Springfield Safety Council recently conducted a campaign to rid the city of the many fires due to the use of wooden barrels for ashes and rubbish. Circulars calling attention to the hazard were distributed from house to house. The effects of the campaign have been clearly evident in the reduction of fires from this cause.

Kansas City, Mo.

The fire record of Kansas City has also been very unfavorable for a number of years. In this city a Citizen's Fire Waste Council, composed of seventy-five business men, has been created, and largely through the efforts of this Council a bond issue of $1,500,000 for improvement in the fire protection facilities of the city was authorized by the voters last November.

Huntington, W. Va.

Similarly, in Huntington, following the creation of a fire prevention committee of the Chamber of Commerce in February, 1925, a bond issue of $215,000 for fire department improvements was authorized in May, 1925.

A new electrical code and system of inspection have also recently been adopted through the efforts of the committee.

Chelsea, Mass.

The bad fire record and serious conflagration hazard of Chelsea were brought to the attention of the citizens through a remarkable publicity campaign conducted by the *Chelsea Evening Record,* beginning in the spring of 1925. As a result of this campaign, a fire prevention commission was appointed and has functioned successfully in securing a marked improvement in the construction, protection, and inspection of the hazardous district of the city.

Providence, R. I.

The fire prevention committee in Providence was successful in securing the creation of a fire prevention bureau in the Fire Department in January, 1926. This bureau is now conducting a campaign to rid the city of old fire-traps, long a menace to surrounding property. Similar campaigns to improve the existing structural conditions are being carried on in Memphis and Indianapolis.

New Orleans, La.

One of the chief hazards in New Orleans was the portable oil heater in homes. Because of climatic conditions, many homes in the city depended entirely on this type of heater, and many fires occurred. A subcommittee of the Chamber of Commerce fire prevention committee took this matter in hand and secured

Spectacular, But They Come High

AN EFFECTIVE COMMENT ON THE FIRE RECORD OF DALLAS, WHICH APPEARED IN THE "DALLAS NEWS"

correction of hazardous features of these burners from the manufacturers, at the same time carrying on a publicity campaign to acquaint the public with the proper handling and use of the burners. A marked decrease in fires from this cause has been effected.

The committee has secured improvements in the protection of the large wharf district of New Orleans.

Grand Rapids, Mich.

A unique campaign has been developed in Grand Rapids and is now in its second year. A continuous publicity campaign, with various civic and commercial organizations each made responsible for one week in the year, has brought the matter of the fire loss and its importance constantly before the citizens. By this method the burden of the campaign is not heavy on any one organization, and the results obtained have been excellent. The various interests in the city have competed to make this particular part in the program stand out from the others, and many new and effective appeals have thus been created.

Lawrence, Mass.

The fire prevention committee of the Lawrence Chamber of Commerce was appointed in April, 1925, and shortly thereafter secured the creation of an inspection bureau in the Fire Department. This committee has been functioning most effectively in arousing interest in its work throughout the city.

Lynn, Mass.

The Lynn fire prevention committee secured the adoption of an ordinance prohibiting the use of wooden shingle roofs throughout the city limits on April 20, 1926.

Milwaukee, Wis.

The fire prevention committee of the Milwaukee Association of Commerce has a long record of accomplishment. This committee meets weekly the year round and maintains close contact with the city officials. A very successful fire prevention school and a watchmen's school have been conducted, and employees of nearly every industrial establishment in the city have received the benefit of this instruction. The favorable loss record in Milwaukee can be largely attributed to the work of this committee.

Richmond, Va.

The Richmond fire prevention committee has been instrumental in preparing a comprehensive fire prevention code designed "to regulate the keeping, storage, use, manufacture, sale, handling, and transportation, or other disposition of flammable materials and rubbish, explosives, pyrotechnics and flammable films; and to regulate dry-cleaning establishments, garages, fire exits, fire extinguishers, oil-burning equipment, and storage of matches and flammable liquids." This code is now before the City Council for adoption.

St. Paul, Minn.

A fire prevention committee in St. Paul, appointed last October, has already secured the creation of an arson squad to investigate and prosecute incendiary fires and the adoption of an oil burner ordinance.

Wilmington, N. C.

Through the effort of the fire prevention committee, created in December, 1924, a complete new building code has been prepared, and on February 8, 1926, the code was turned over to the City Commissioners.

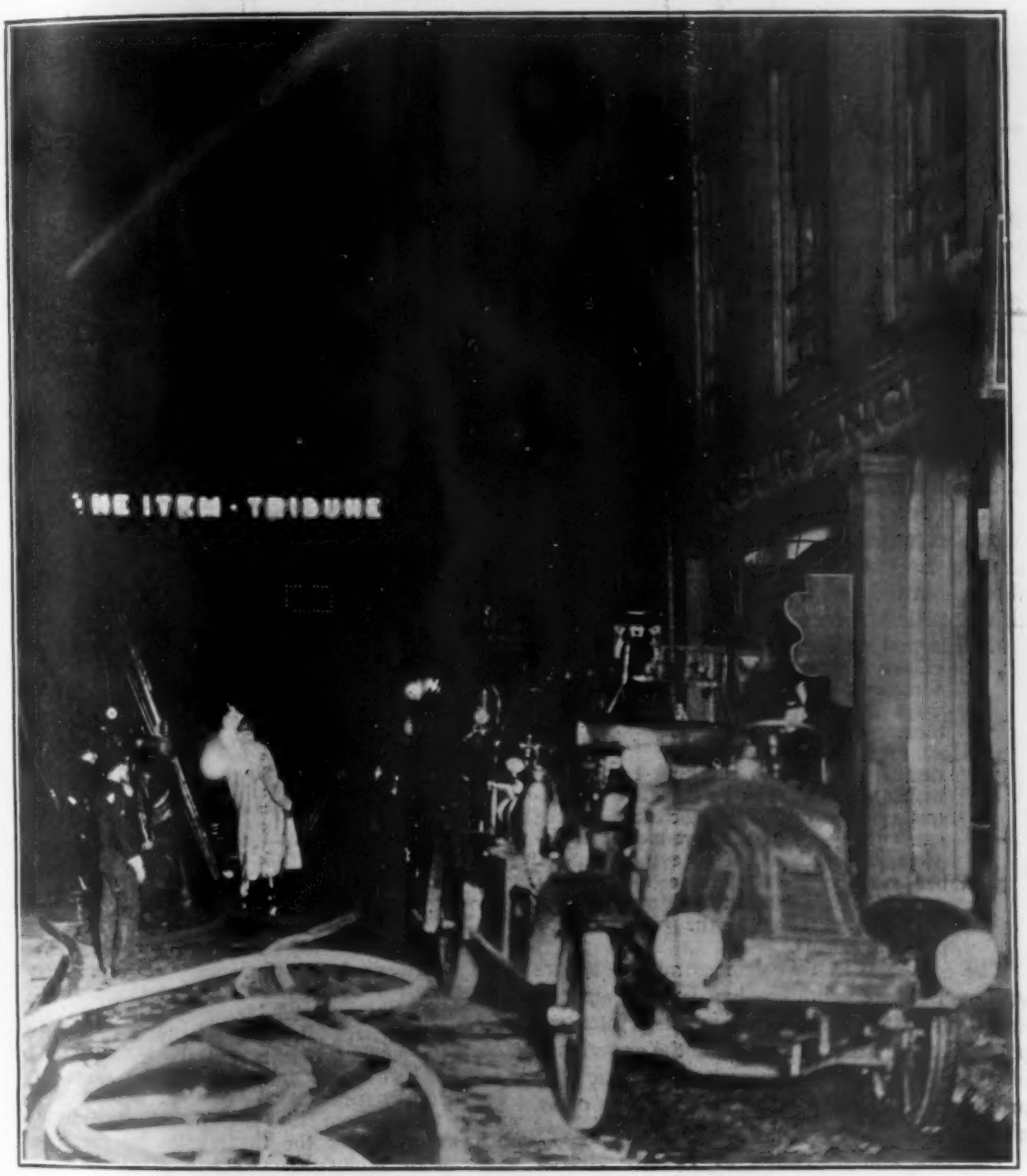
The instances cited above give some indication of the work that is being carried on by cities in various sections of the country and the variety of problems which must be considered. It is only through patient, steady effort by competent, intelligent citizens that tangible results in decreasing the fire waste in any community can be obtained. The gradual awakening of our cities to a realization of their responsibilities and their share in the national movement to overcome this annual heavy loss of life and property is a good omen for the future. The day is close at hand when the city with a bad fire record will be classed with the city with a bad crime record and will be called upon to answer for neglecting its responsibility.

FIRE CHIEFS TO MEET IN NEW ORLEANS THIS MONTH

An important event in the fire protection world will be the annual convention of the International Association of Fire Engineers, to be held in New Orleans, October 19-22. Secretary of Commerce Herbert Hoover will be the guest of honor at the banquet on the evening of October 20.

Through the courtesy of Chief Engineer John M. Evans, The American City has received the photograph reproduced on the next page, of a recent successful job of fire fighting by the New Orleans department.

Prompt Action of New Orleans Fire Department Prevents Widespread Conflagration



THE intelligent and fearless way in which the New Orleans Fire Department attacked this fire in the heart of the city's business district was responsible for curtailing the spread of the flames which threatened the destruction of an entire block. The total damage from fire and water to the buildings and their contents was estimated at not more than $50,000.

The fire, the cause of which has not been determined, started on the third floor of a four-story brick structure occupied by an advertising novelties company, and rapidly spread to the floors above and below, seriously menacing the buildings on either side, one of which was the home of the New Orleans *Item-Tribune*. The report of the fire was received by the Fire Department at 9:30 in the evening and by 10:15 the flames were under control and confined to the top story of the building in which they originated. It required the efforts of twelve fire companies, however, under the leadership of Chief Engineer Evans, to completely extinguish the fire shortly before midnight.

A Traffic and Public Safety Demonstration

By W. Graham Cole
Safety Engineer

THE safe and adequate control of traffic has become one of the major problems confronting the municipal authorities of practically all American cities. The prevention of public or street accidents, which have increased on such a tremendous scale within the past few years, has become a matter of great concern to those interested in the conservation of human life.

Early in this year, the New York State Conference of Mayors and Other Municipal Officials and the Metropolitan Life Insurance Company undertook jointly to conduct a traffic and public safety demonstration in Albany, N. Y., in order to obtain information based on actual experience which could be made available to the authorities of other municipalities throughout the country. It was the purpose of this demonstration to determine:

1. The best traffic-control measures, traffic facilities, devices, and methods of law enforcement which help to make the highways in the municipalities safe for vehicular and pedestrian traffic
2. How great a reduction in the number of deaths and injuries resulting from automobile accidents can be made by concentrating and operating efficiently in one municipality all of the best measures, devices, and methods of law enforcement
3. What are the most effective methods of arousing civic interest and of obtaining citizen cooperation in the prevention of public accidents.

The first step in this demonstration—a survey of traffic conditions—has been completed and the results made available in a printed report recently issued. Based upon the experience obtained in making the survey, an outline * of procedure was prepared as a guide to other cities desiring to make a similar study.

The city administration of Albany offered its full cooperation and support in connection with the demonstration. A Traffic Commission composed of representative citizens was appointed by the Mayor to make the traffic survey. This Commission was assisted by the Secretary of the Mayors' Conference and a safety engineer of the life insurance company. As a basis of the survey the automobile accident statistics for the preceding year, as compiled by the New York State Bureau of Motor Vehicles, were analyzed, an accident spot-map was prepared and, with the assistance of the Boy Scouts, a traffic count was made. Local traffic conditions were carefully studied and an opportunity afforded to business firms, organizations and individuals to express their views regarding the various phases of the study as it progressed. Due consideration was given to the effect of traffic on business. As each section of the study was completed, a report containing recommendations was submitted to the Mayor and made available by him to the local press, thus keeping the public advised of the progress of the work.

The scope of the survey is indicated by the titles of the ten reports submitted to the Mayor, which were as follows:

Analysis of Street Accidents
Parking and One-Way Streets
Routing of Through Traffic
Boulevard-Stop Streets
Automatic Traffic Signals
Regulation of Bus Stops
Regulation of Pedestrian Traffic
Enforcement of Regulations
Permanent Traffic Organization
Plans for Public Safety Campaigns

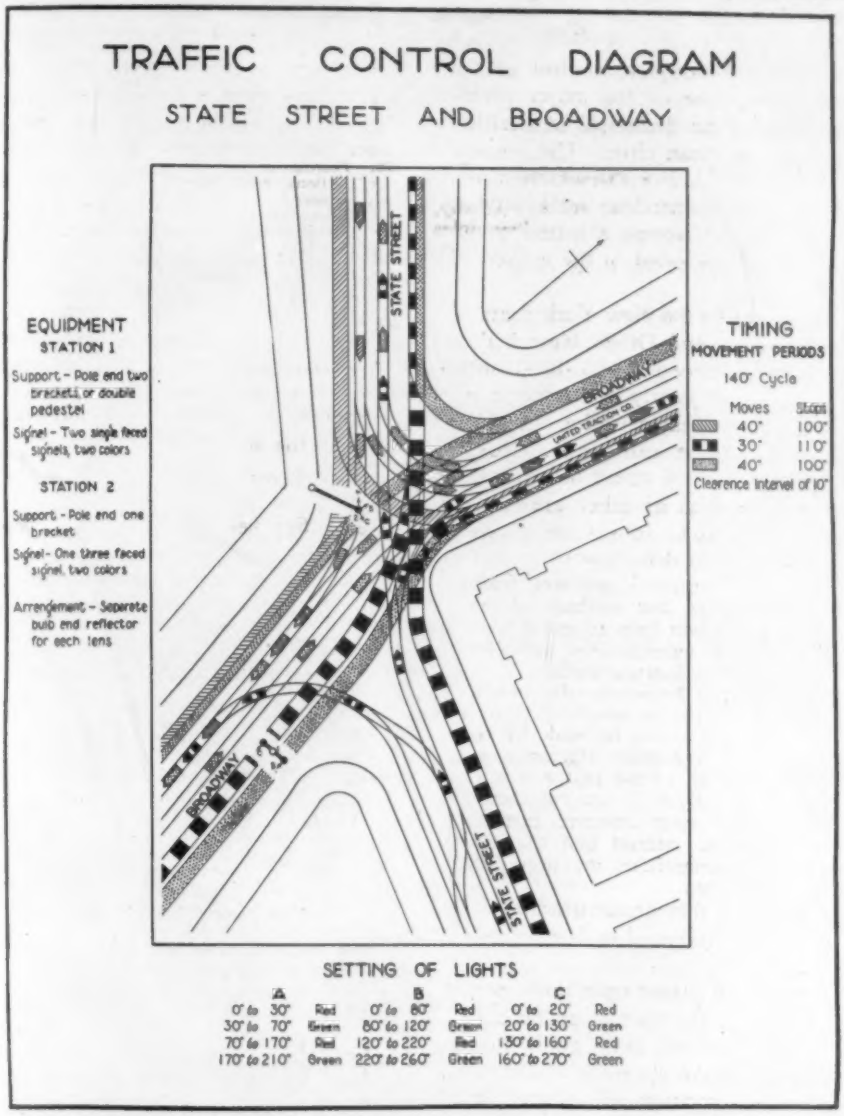
In its final report, the Traffic Commission stated:

"Proper and uniform traffic regulations, efficient and courteous law enforcement, mechanical improvements in automobile equipment, engineering revision of streets and highways and traffic control systems will all prove effective as means of reducing public accidents, but the largest results will not be obtained unless these activities are followed up by continuous educational work. A few facts taken from the analysis of accidents in Albany made for the Commission by the State Bureau of Motor Vehicles will prove the truth of this statement:

65 per cent of the accidents occurred under the most favorable traffic conditions.
60 per cent of the vehicles involved were reported as being in good condition.
43 per cent of the motorists involved in accidents were reported as being inattentive.
20 per cent of the motorists were violating traffic laws.
42 per cent of the pedestrians struck by vehicles were walking, running or playing in the street itself.
17 per cent of the pedestrians were injured while crossing between intersections.

* This outline is included in the printed report and is also published in leaflet form. Copies of the complete report or of the leaflet may be obtained by addressing the Policyholders' Service Bureau of the Metropolitan Life Insurance Company, New York. The Bureau, through its safety engineers, will be glad to correspond with officials of any city relative to the details of the traffic and public safety study, or to assist them in the preparation of plans for similar activities in their communities.

The Commission recommended, therefore, that a continuous safety educational campaign be undertaken in Albany. As a portion of its traffic and public safety demonstration, the Metropolitan Life Insurance Company offered to make available the service of one of its safety engineers to assist the city of Albany in planning and starting such a campaign. This work is now being organized and certain portions of it are in full operation. The program for the campaign is summarized in the accompanying outline of procedure (see next page).



ONE OF THE TRAFFIC-CONTROL DIAGRAMS, PREPARED IN THE ALBANY STUDY, SHOWING ARRANGEMENT AND TIMING OF SIGNAL LIGHTS

In order to carry out the program, an organization has been perfected along lines somewhat different from those usually followed in other cities. Many community safety movements have experienced considerable difficulty in obtaining adequate financial support. To overcome this difficulty in Albany, the Mayor has requested existing organizations such as the Chamber of Commerce, automobile clubs, service clubs, women's clubs and improvement associations, to join with him in the public safety movement, each organization to carry out and finance some particular portion of the entire program. The individual members of the clubs and associations of Albany feel that they have actual participation in the safety campaign and the scope of definite interest is

thus widened. Furthermore, the need for central financing is removed.

The Central Safety Committee, composed of an accredited representative of each participating organization, has been formed to serve as a correlating agency, so that the various activities will be conducted in conformity with each other. A complete story of the safety campaign and the results obtained will be printed and made available at a later date.

The TRAFFIC PROBLEM

An Outline of Procedure

The study of the traffic problem in Albany, N. Y., has emphasized certain underlying principles and has suggested a definite plan of procedure which is offered as a guide for other cities.

The Problem

The traffic problem of any city may be considered as involving the following three general phases:

1. *Traffic Control.*—To relieve congestion and to expedite the movement of traffic in a safe and efficient manner
2. *Regulation of Parking.*—To provide for the reasonable accommodation of parked vehicles on the streets, with a minimum interference to moving vehicles and with proper consideration to business interests affected
3. *Prevention of Accidents.*—To make the streets as physically safe as possible and to encourage their safe use by both motorists and pedestrians

The Solution

The solution of this problem is dependent on four general activities:

1. An engineering survey of existing conditions
2. A determination of the necessary steps required to alter conditions to suit present and anticipated needs.
3. The introduction of the suggested changes
4. A continuous educational campaign

The Means

The Committee on Metropolitan Traffic Facilities of the Second National Conference on Street and Highway Safety has recommended:

1. A permanent Traffic Commission, composed of the heads of city departments interested in the matter, such as police, fire, engineering, and legal
2. An engineering staff in charge of a competent traffic engineer at the service of the Traffic Commission
3. An Advisory Committee composed of representatives of civic bodies, trade and commercial organizations, railway, bus, and taxicab companies, automobile clubs, and other interested groups

The Engineering Survey

An unbiased engineering survey of existing conditions is essential. As traffic conditions are continually changing, repeated studies must be made from time to time. They should include:

1. A traffic count to determine the heaviest traveled routes, the relative importance of various streets, particularly in the congested section, the types of vehicle and the hourly variation in the traffic flow
2. A study of the causes, locations, and trend of street accidents
3. A study of existing physical conditions at locations where traffic is congested or where numerous accidents occur
4. A study of the available parking space in the business section and the actual effect of parking on business and on the movement of traffic

Requirements

Based on the information obtained by the survey, a determination should be made of the steps essential to the more even flow of traffic, the relief of congested locations and the prevention of accidents. They would probably include:

1. Revision of existing regulations
2. The selection and designation of one-way streets
3. Limitations on parking
4. Elimination of left-hand turns
5. Routing through traffic around congested section
6. Traffic-control systems, automatic or manual
7. Designation of boulevard-stop streets
8. Engineering changes, such as widening streets, cutting sharp corners, removing obstructions to vision and repairing dangerous conditions in street surface
9. Street marking, pedestrian crossings, traffic lanes, parking spaces and intersection markers
10. Posting one-way streets, parking and speed regulations, boulevard-stop streets and through traffic needs.
11. Regulation of street-car and bus stops
12. Designation and marking of safety zones or loading spaces
13. Improved police supervision of traffic, including a Police Traffic School
14. Efficient handling of traffic cases by the courts

Program

A program should be prepared by the city administration for putting into effect as promptly as possible the improvements suggested by the foregoing list and determined upon by the survey.

Continuous Safety Educational Campaign

Regardless of the efficiency of the engineering survey, how well adapted the changes and revisions are, or how sincerely the administration follows this program, the results obtained will be dependent on the following factors:

1. The cooperation of business and commercial organizations, particularly in cases where the suggested changes, although for the benefit of the public at large, may apparently be determined to individual interests
2. Intelligent and courteous enforcement of regulations by the Police Department
3. Active support of traffic regulations and requirements by the courts
4. Public approval of the administration's traffic program
5. Realization by the public of the importance of public safety
6. Active cooperation of the public, based upon a more accurate knowledge of the hazards of the street and methods of overcoming these hazards

Securing This Cooperation

To secure this cooperation it is essential that a continuous educational campaign be conducted. It is difficult to establish a new organization which can of itself, within a period of years, reach every man, woman and child in the community and convince them of the purpose of the campaign and of their individual responsibility to make the streets safer and to help expedite the movement of traffic. It is possible, however, to utilize the machinery of existing organizations, which at present reach large portions of the population and are interested in the business, commercial and civic welfare of the community. This can be accomplished by the establishment of some committee or other body representative of these organizations. Such a body could be organized as a local Safety Council, a Public Safety Committee or a Safety Bureau of the Chamber of Commerce and should be created for the following purposes:

1. To prepare and sponsor a plan for a continuous educational campaign
2. To secure the active support and assistance of exist-

ing organizations in carrying out designated parts of this campaign

3. To serve as a directing or correlating agency in order that the educational work will appear to the public as a united movement

Organizations to Include

A careful study should be made to determine what organizations should be included in this body. The following are suggested for consideration:

Chambers of Commerce
Commercial Exchanges
Trade Associations
Automobile Associations—Owners and Dealers
Civic Organizations
Service Clubs
Public and Parochial School Authorities
Parent-Teachers' Associations or Mothers' Clubs
Labor Organizations
Women's Clubs
Engineering Societies
Religious Bodies

Each organization should be encouraged to select, conduct, and finance, as its own activity, some phase of the safety program, under the general guidance of the central safety body.

Executive Committee

It is advisable that this directing body be called together and its work outlined by an Executive Committee composed of outstanding citizens who can command public confidence, and of officials of the state and city governments and business organizations whose regular duties qualify them to assist in this work. The membership of this committee should be selected after careful study and it may be advisable to have them appointed by the Mayor.

Community Educational Program

The experience of many cities in dealing with educational campaigns to interest the general public in traffic and safety matters has indicated that there are a few fundamental activities which, if carried out effectively, will produce the greatest possible results. The following are suggested:

1. *Poster Display*—Advertising safety by large posters prominently displayed at street intersections, in schools, police precinct stations and fire houses, and carried by street cars, motor busses, taxicabs and commercial vehicles
2. *Safety in Schools.*—Teaching safety in public, private and parochial schools through a plan of incorporating accident prevention material in the various subjects taught daily in the classroom and by the formation of safety clubs among the school children
3. *Cooperation of Press.*—Proper and continuous publicity in the daily press, trade and labor publications and other organs reaching the local public
4. *Drivers' and Industrial Schools.*—A course of instruction in safety and efficiency for the operators of commercial or private vehicles. If there are a number of industrial companies located in the community, it may be advisable to prepare a course on safety for the foremen and other supervisors of industrial plants, including railroads
5. *Safe Drivers' Club.*—Signed pledge of observance of state automobile law cit traffic regulation and safe driving practice
6. *Organization Meetings.*—Provide speakers and arrange safety program for meetings of various organizations
7. *Distribution of Safety Literature.*—Prepare or obtain and distribute clear and interesting safety literature directly into the homes
8. *Churches.*—Secure active cooperation of churches
9. *Moving Pictures.*—Safety fillers in news reels and safety slides
10. *Safety Parade.*—Held not oftener than once a year to arouse renewed interest

In Chicago and Detroit Special Assessment Is Recommended

(An Editorial from the Electric Railway Journal for September 4, 1926)

RECOMMENDATIONS just made by the Subway Advisory Commission in Chicago and the Rapid Transit Commission in Detroit both provide for the financing of a relatively large part of rapid transit construction by special assessment against benefited property. In St. Louis, also, those in charge of rapid transit investigations for the city favor this method.

The Chicago recommendations are particularly significant in that those who make the report propose to assess themselves. The Advisory Commission is made up of large property owners and merchants in the Loop district, whose property would be directly affected by the recommendations. It is indeed a long step forward in providing adequate transportation on a self-supporting basis when property owners recognize the equity of financing construction out of the increased property value which comes from the improvement.

It is high time that the owners of centrally located business property recognize not only the equity but the business wisdom of subscribing to this method of financing transit construction. Although such construction is usually considered expensive, when analyzed in comparison with street widening projects in terms of the number of people served for transportation it becomes relatively low in cost.

Provision of rapid transit in central business districts, where congestion makes grade separation most imperative, is usually not favored by outlying districts. The common contention is that such facilities benefit the central district at the expense of outlying sections. When construction is financed by general corporate securities this contention is in a sense justified. But when the benefited property is made to carry a large part of the cost this position on the part of outlying property becomes no longer tenable.

Thus do the downtown property owners on the Chicago Commission demonstrate wisdom in their recommendations. Obviously, expensive subways should be constructed only in that area in which traffic density justifies the expense. But when general corporate funds are used there is always an intense pressure to build many miles of subways where they are economically not justified.

A rapid transit system built by special assessment is soon paid for by the benefited property and becomes a heritage to posterity. When financed from general corporate funds an enormous floating debt is passed on to future generations, and needed future additions to facilities are consequently curtailed. This has happened in New York. Although many times the subway cost is represented in the increased property values created, failure to utilize part of this created value for the subways themselves has brought about a most serious situation. If transportation construction creates property value over and above its cost, why should not a portion of the increase be diverted to provide transportation facilities? The electric railway industry may well afford to give increased attention to this important question.

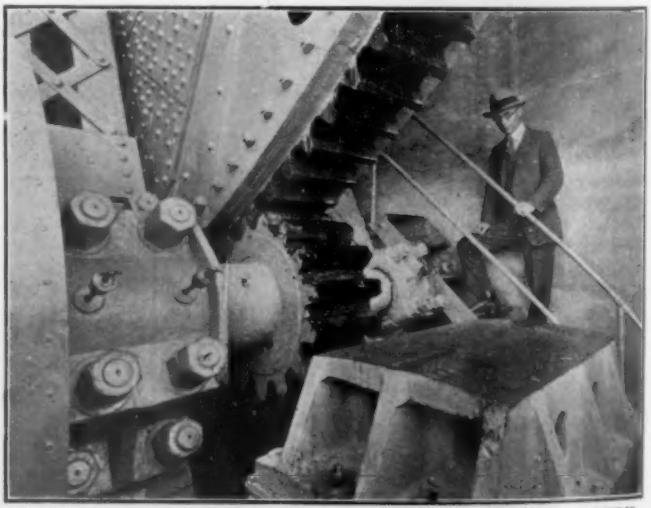
PORTLAND, OREGON, LOOKING NORTH DOWN THE WILLAMETTE RIVER TOWARDS ITS CONFLUENCE WITH THE COLUMBIA RIVER. BUSINESS DISTRICT AT THE LEFT
In the foreground is seen the Burnside Bridge, beyond which is the railway bridge and still further back the Broadway Bridge

The New Burnside Bridge at Portland, Oregon

Combined Steel and Concrete Structure an Important Traffic Link for the City

THE construction of the new Burnside Bridge across the Willamette River at Portland, Ore., completed in June, 1926, was of necessity. Old travelers of the Oregon Trail were balked by many streams, among them the Willamette River in Oregon near its confluence with the Columbia. Transportation could not stop, so a ferry became a link in the historic road. As time passed and transport grew heavier, the ferries were no longer adequate and a bridge was built. Other bridges followed. Still the traffic grew, until even these bridges were inadequate. New bridges have come to replace the old. These are wide enough and constructed to carry the thousands of motor vehicles and the electric railways which have taken the place of the ox-cart that first traveled the Oregon trail. The Burnside Bridge, which extends from Union Avenue and Burnside Street on the east side to Third and Burnside Streets on the west side, is one of the latest and most modern.

The Burnside Bridge is of great importance to the city of Portland, which is literally cut in two by the Willamette River. On the east side are most of the residential districts. On the west side are the business and industrial sections. The bridge consists of two steel deck trusses with a central Strauss trunnion bascule span over the channel, with a concrete encased steel viaduct on the east side over the railroad yards. Reinforced concrete approaches and earth embankments connect with present street



MAIN RAMP AND PINION AND LIVE-LOAD SHOE OF THE BURNSIDE BRIDGE BASCULE

grades. The entire structure carries an unsurfaced reinforced concrete pavement. The use of concrete on the bascule span is, it is believed, the first departure from former methods. This material was used because of the minimum wear, thereby eliminating trouble and repair expense, and because the factor of safety to motor travel is high.

The total length of the bridge is 2,307 feet between abutment walls. Its total length, including approaches, is 2,925 feet. The river span includes two truss spans of 266 feet, 5¼ inches, and one double leaf bascule span measuring 252 feet between trunnions.

The width of the river channel is 213 feet between the bascule piers. The maximum vertical clearance of the bascule span is 70.37 feet above city datum, or 67.27 feet above government datum, which is considered identical with "low water." The bases of the main bridge piers are 68 x 78 feet, while the main shafts of these piers are 55 x 65 feet. The roadway rises to a maximum elevation of 77.65 feet above city datum with a maximum grade of 3.84 per cent on the west approach.

On the approaches west of Front Street and east of East Second Street, the roadway is 90 feet wide between curbs, and the sidewalks have about 8 feet clear width. This accommodates two street-car tracks and in addition thereto six lines of traffic.

Through a bottle-neck arrangement the width of the roadway for the river spans and part of the approaches is narrowed to 68 feet, giving space for two street-car tracks and four lanes of traffic. The sidewalks are about 7 feet wide.

At Front Street staircases lead to the bridge and also to loading platforms. At Second Street all four street corners and two loading platforms are connected by a subway. A similar subway connects the southeast and northeast corners at the intersection of Burnside and Third Streets.

The bascule span is not one of the longest in existence, but it is unusually wide and heavy. Each bascule leaf weighs about 930 tons and is balanced by a counterweight which weighs approximately 1,700 tons. The total weight of 2,630 tons is supported on two trunnion pins, each of which carries 1,315 tons. The whole leaf revolves around the two trunnion pins when the bridge is being either opened or closed.

In the closed position the bascule leaves are locked one against the other so as to prevent any relative movement when, for instance, a street car passes from one leaf to the other.

THE COMPLETED BURNSIDE BRIDGE OPEN FOR PASSAGE OF VESSEL
This picture is taken looking north toward the railroad bridge

For the operation of the bascule leaves there are four motors of 70 horsepower each. These motors act through a series of gears in a pinion which drives circular racks attached to the main trusses. The theoretical time for complete opening is nearly 70 seconds, but whereas there is under ordinary conditions an excess of power, the actual opening or closing time may be about one minute. Not only the bascule leaves, but also the center lock and the roadway gates are electrically operated.

Ordinarily the whole bascule span will be operated from the west side, although it is possible to operate each leaf from its own side. A submarine cable connects the two bascule piers, thus making it possible to transfer the current from one side of the bridge to the other. This makes it possible to operate the bridge even if the current supplied from the west side or from the east side breaks down.

The Burnside Bridge was financed by a

bond issue voted by the people of Multnomah County in 1922. It cost approximately $2,650,000, and the entire project, including approaches, $3,000,000. The main contract for constructing the bridge was let on July 21, 1924, for the sum of $2,390,173. This sum included taking down the old draw-span and removing the old piers. Additional contracts were let on November 9, 1925, for the sum of $93,976 for completing the approaches, and, on September 21, 1925, for the sum of $11,853 for the lighting system, not including certain later modifications embracing the approaches. The total appropriation for the construction of the Burnside Bridge was $3,000,000. This sum has proved sufficient and it is even expected that a substantial amount will be returned to the taxpayers.

The Burnside Bridge was constructed under the direction of the Multnomah County Commissioners, Amedee M. Smith, Erwin A. Taft, and Grant Phegley. Gustav Lindenthal, of New York, was consulting engineer; Hans H. Rode, Resident Engineer; M. E. Reed, principal Assistant Engineer; the Pacific Bridge Company, general contractor; Booth & Pomeroy, subcontractors for steel erection; Lindstrom and Feigenson, subcontractors for approaches; and the American Bridge Company, subcontractors for structural steel.

New Filtration Plant for Progressive Southern City

By R. Alton Jackson

WINSTON-SALEM has just put into operation one of the largest modern water purification plants in North Carolina. The capacity of the plant is about 16,000,000 gallons daily, and the entire cost of construction was about $600,000.

Winston-Salem's water-supply comes from Salem Creek, being impounded in a large reservoir with a capacity of about one billion gallons located two miles from the plant. During the past season the level on this lake lowered only a few inches, despite the fact that one of the worst droughts in years visited this section.

From the impounding reservoir the water is conducted to the filtration plant at the waterworks through two pipe lines each 10,000 feet long. One of these lines is 30 inches in diameter and the other 36 inches.

Chemical Building

Water from the impounding reservoir enters the mixing chambers in the new chemical building through a 36-inch Venturi meter. As the water enters the mixing chambers, alum is applied automatically by a Savage dry feed machine. Three of these machines are in the building, one used for alum, one for lime, and one held in reserve. Lime is used in the water only when the water is low in alkalinity. Alum is always used.

Just ahead of the mixing chamber is a balancing chamber in which is set a float controlling a 30-inch hydraulic valve, thus automatically admitting water to the mixing chambers as needed and preventing overflow in any part of the plant.

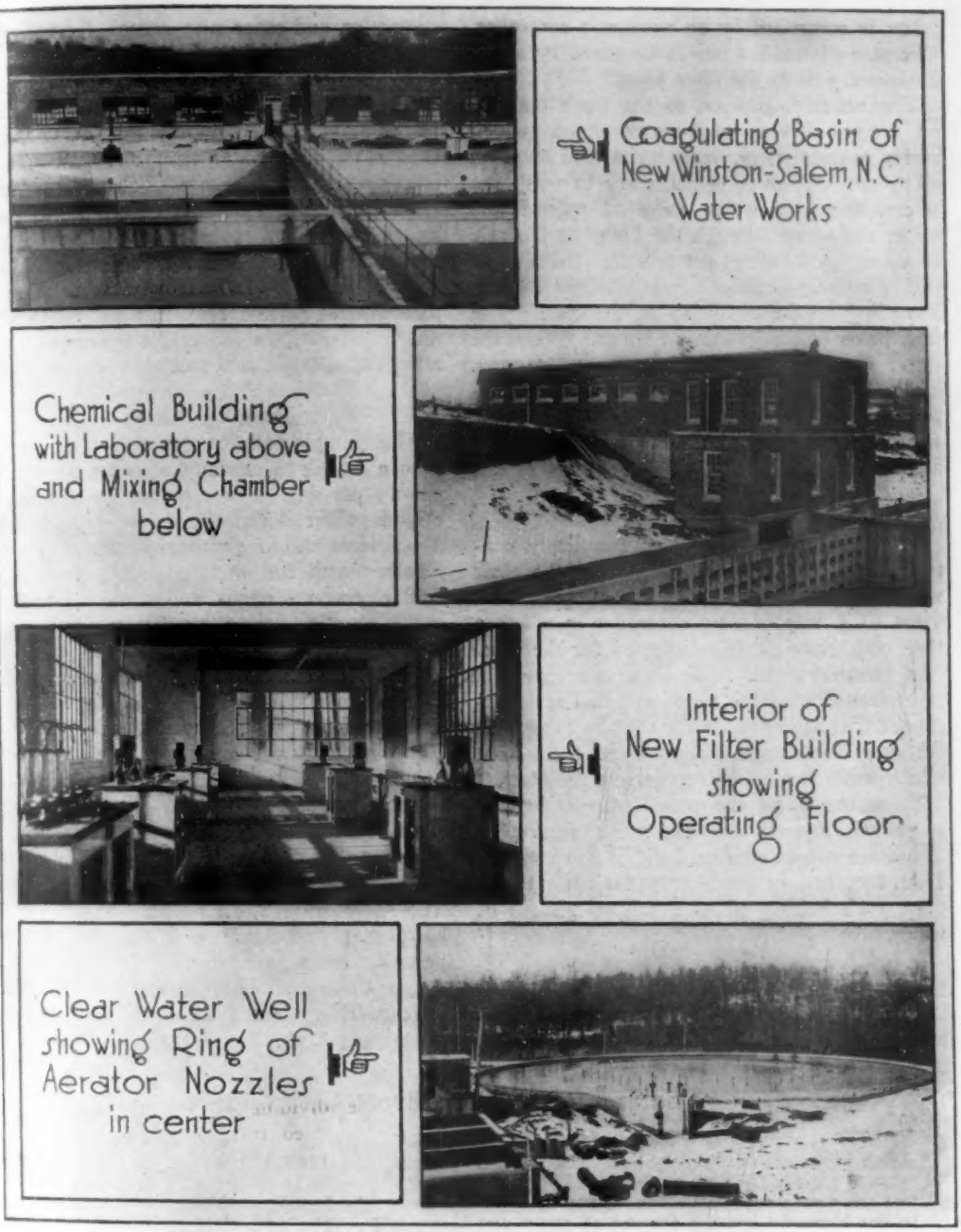
The mixing chambers are concrete tanks in which are set mechanical agitators, electrically operated, by which the water and chemicals are violently agitated and thoroughly mixed. By this means the minimum of alum is used and quick and positive coagulation is secured. The laboratory is on the second floor of the building, in charge of a chemist, who makes daily analyses.

Coagulation Basin

From the mixing chambers the water enters the coagulation basin through a stilling well. This basin is 150 feet square and 13 feet deep, with a capacity of about 2,180,000 gallons of water. Through the center of the basin is a concrete dividing wall which allows the basin to be used in series or parallel. The chemically treated water is passed slowly through these basins, where the floc and entrained impurities settle out. The settled water flows over a submerged weir and through a concrete flume to the filters.

Filters

The filters are constructed of concrete with 29 inches of sand and 22 inches of gravel, underlaid with cast iron pipe laterals which conduct the water to an effluent pipe, 24 inches in diameter, for each six filters. The new plant consists of eighteen filters with a combined capacity of about 16,000,000 gallons every 24 hours.


Coagulating Basin of New Winston-Salem, N.C. Water Works
Chemical Building with Laboratory above and Mixing Chamber below
Interior of New Filter Building showing Operating Floor
Clear Water Well showing Ring of Aerator Nozzles in center

VIEWS OF THE NEW WATER-WORKS AT WINSTON-SALEM, N. C.

The filters are enclosed by a fireproof brick building. In the basement of this building are all necessary pipe and hydraulically operated valves, placed on a gallery. On the upper, or operating floor, are located operating devices. Each filter is controlled by an independent operating table on which are the levers for operating the valves just underneath.

On each table are also a rate of flow gage and a loss of head gage and a turbidity indicator. There are five valves for each filter. The turbidity indicator, by means of a high-powered incandescent lamp, shows at all times the character of water passing through the filter. On each filter effluent pipe is a Simplex rate controller.

Wash-Water Tanks

The elevated water-tank is located near the filter building. The rate of flow of the wash

water is controlled by an automatic controller. The rate of wash water is indicated by an illuminated dial in the filter plant.

The water is pumped to the wash tank by an electric-driven wash-water pump, which starts automatically, insuring a full tank at all times. When it is necessary to wash the filters, the wash-water valve is opened and water rushes up through the filters at the rate of about 5,400 gallons per minute. From three to five minutes is necessary to wash each filter, according to the condition at the time. The tank holds 80,000 gallons of water. When the water reaches a low level in the water-tank, a float automatically starts the pump to replenish the supply. When the tank is full, the float automatically releases another control, and the pump is cut off.

Clear-Water Well

The rate of filtration is automatically controlled by the elevation of water in the clear well. This is done by the use of a Simplex Type BCA rate of flow controller in which a fluid counterweight is substituted for the usual iron counterweight. The fluid counterweight is connected with the clear well and is so arranged that as the water rises in the clear well, the controller automatically reduces the rate at which water can be delivered from the filter.

From the filters the water travels through a 36-inch pipe to the clearwater reservoirs. These are two in number, built of concrete and about 175 feet in diameter and about 13 feet deep, each holding about 2 million gallons of water.

Aerators

During certain seasons of the year, especially in summer, when, because of algae growth, stagnation and other such causes, the water in the impounding reservoir has a noticeably disagreeable odor, and also when carbonic acid gas is high, there is trouble from "red water" in the services. To remedy this, aerators are used in the clear-water reservoir. The aerator is composed of an octagonal-shaped cast iron ring, 90 feet in diameter, tapped by fifty-six 3-inch riser pipes, spaced around the ring. On the end of each riser is fixed a bronze turbine spray nozzle. The water when pumped through this aerator rises in a fine spray, ridding itself of the disagreeable odors and liberating the carbonic acid gas.

Pumping Station

The pumping-station contains nine pumps, with a combined capacity of about 25 million gallons per day. These pumps include two 4-million-gallon electrically driven pumps, three 2½-million-gallon electrically driven pumps, together with one 2-million-gallon steam-operated emergency pump, and three 2½-million-gallon gasoline-driven emergency pumps.

From the clear-water well the water is carried to the sterilizing chamber, where liquid chlorine is applied. From this chamber it is carried to the pump suction well, where it is then pumped to the consumer.

The new plant was designed by Harry L. Shaner, Commissioner of Public Works, and R. A. Thomas, Resident Engineer during construction. C. E. Carter, Superintendent of the old plant, is Superintendent of the new plant. The American Water Softener Company, Philadelphia, placed the filters in the plant, and the pumping equipment was placed by the Morris Pump Company, Baldwinsville, N. Y. The Chicago Bridge and Iron Works furnished the wash-water tank.

The Importance of Street Cleaning

STREET cleaning is now considered one of the most important of municipal services. When streets were only dirt roads, sprinkling was all that the people expected. The density of population has increased and the amount of street dirt has decreased, but the character of street dirt has changed so that there is now less coarse dirt and relatively more of fine dust which is easily blown into residence and business houses. Beside the general discomfort from it, there is material damage caused to the stock of business houses, to the health of the people breathing it, and to the citizens' pride in their city.

The effect of fast-moving motor traffic has been, first, a gradual decrease in the total tonnage of street sweepings; second, pulverizing that which is left, and, third, scattering this pulverized dirt about more widely.

Refuse appears on the street principally in two forms, fragments of various sizes and fine dust. The sources of street dirt may be divided into two classes, the largely avoidable and the largely unavoidable. The first class includes building materials and waste from new construction, waste from rebuilding and alterations, materials from street repairs and excavations, sidewalk sweepings, dirt and refuse thrown into the street by pedestrians. The second, or unavoidable class of dirt, includes mud and dirt from adjoining unpaved streets, leaves, dirt and grass distributed from vehicles, and sand dropped on streets on which there are street-car lines.

ACKNOWLEDGMENT.—From a report on street cleaning issued by the Kansas City Public Service Institute, Kansas City, Mo.

Investigating Inadequate Sewers—I

By Alden Wells

Assistant Engineer, Department of Engineering, Hartford, Conn.

THE sewers of a city may become outgrown just as truly as other things with which we are more familiar grow old and worn out. But to determine just when a sewer has become sufficiently inadequate to require remedy is not a simple problem. It can not be figured by any formula. Rather, one must weigh together many factors such as the amount of inconvenience caused by the present condition, possible schemes of relief and their cost, methods of financing improvements, probable future conditions, and various other elements which may creep into the problem. Of course, in theory, the sewerage engineer has only to figure the drainage area of a given sewerage district, from that determine its run-off, and provide a sewer of just that capacity. But in practice the engineer studying the adequacy of existing sewers and ways to supplement them has also to consider those other factors in the problem. The engineer in municipal service must not only satisfy himself as to the proper solution of a problem, but must be able to convince others that his solution is a proper one.

Can You Present Your Case to the Council Satisfactorily?

In this treatise the author, who has been responsible for the introduction and development of most of the methods described, under the direction of Roscoe N. Clark, City Engineer, presents an excellent discussion of the methods employed in Hartford in investigating sewer overflows and alleged damages. He has also shown a variety of ways of presenting findings to boards and to the public with clearness, dispatch and economy. If you have ever experienced any difficulty in adequately presenting your findings at a public hearing, this discussion will prove invaluable to you.

It is the purpose of this article to outline some methods which have been used by the Department of Engineering of the city of Hartford in investigating the adequacy of existing sewers and, more particularly, methods which have been used in explaining to boards of non-engineers and to other interested parties the results of investigations and recommendations based on them.

Hartford's Sewers

Hartford has a combined system of sewers; i.e., both storm water and sanitary wastes are carried in the same pipe. There are about forty overflows by which the surplus water is discharged during severe storms.

The oldest sewer now in use was built eighty years ago. Year by year since then additions have been made to the system. About thirty years ago an intercepting sewer was built to carry the dry-weather flow of over half the city's area. Great changes have come over the city in the last generation, and even greater still in the last eighty years. Needless to say, some of the older sewers have become outgrown long ago; some having been relieved once have needed relief yet a second time. Each season sees some questions raised respecting the service rendered by one or more old sewers; sometimes through a complaint from an injured property owner; and sometimes because the time is opportune to improve sewer conditions in connection with some other project.

City Engineer the Fact Finder

When such questions are raised, the Board turns to the city engineer for advice. He must gather the facts and advise them as to what, if any, change is needed, its cost, etc. The Board bases its action on his report. The engineer must have his facts so arranged that he can explain the whole clearly to persons who have little or no prior knowledge of sewerage works. This matter of putting technical facts into simple, understandable form is sometimes a problem in itself. Graphic illustrations are often useful. The illustrations with this article show several examples of how features of sewerage problems were visualized at board meetings or before public hearings.

Ways of Presenting Findings

Time and effort spent in getting reports into good form for presentation are well spent. Many sewerage problems are recurrent or chronic. The first time a complaint is made relief may not be provided. But the same drainage problem is likely to come up for

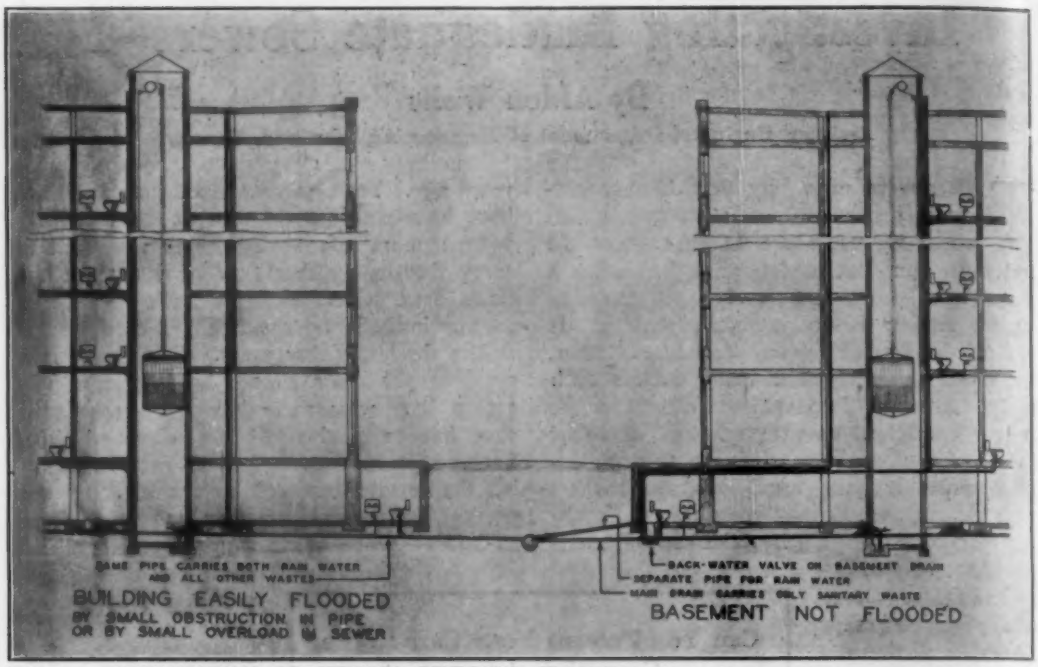

SAME PIPE CARRIES BOTH RAIN WATER AND ALL OTHER WASTES
BUILDING EASILY FLOODED
BY SMALL OBSTRUCTION IN PIPE OR BY SMALL OVERLOAD IN SEWER
BACK-WATER VALVE ON BASEMENT DRAIN
SEPARATE PIPE FOR RAIN WATER
MAIN DRAIN CARRIES ONLY SANITARY WASTE
BASEMENT NOT FLOODED

FIG. 1.—CROSS-SECTION OF TYPICAL BUILDING, SHOWING HOW BASEMENT MAY BE PROTECTED AGAINST FLOODING BY A PROPER LAYOUT OF PLUMBING WORK

study again. Furthermore, in some cases, the proceedings drag out over a long period during which it may be necessary to go over the whole explanation several times. When data, plans, diagrams, etc., may be used more than once, one is justified in using considerable time and labor in putting them into presentable shape. In any case, it is the duty of the engineer to make his report to the Board in such form that its members can clearly and easily grasp the facts and act intelligently on his advice. City boards and the public will have more respect for the advice of the engineer if it is laid before them in a form which they can understand.

At Hartford the City Engineer uses a projecting lantern in explaining plans, etc., to the Board. This is particularly useful at public hearings. The drawings or pictures are displayed on one side of the room where he can easily point out particular features and concentrate the attention of his audience on the single feature under discussion. The drawing is on the wall where everyone in the room can see it and follow the pointer as the feature is explained.

Preparing the slides is not a heavy burden. At Hartford they are made right in the engineer's office by one of the regular employees. The expense of slides is thus very small. If it was necessary to have them made outside, the expense would be more and the results less satisfactory. Since the slides are made in the office it is possible to give detailed directions as to just what is wanted. There is an advantage in having the photographic work done by a man who himself has some understanding of what the drawings represent. Furthermore, it is possible to make more than one slide from the same basic drawing. Successive views may show various aspects of the problem, alternative schemes drawn on a common groundwork and scale, or perhaps details on a larger scale. A drawing can be photographed, then altered and photographed again; or a similar effect may be secured by drawing directly on various slides made from the same negative. Different parts of a plan may be photographed separately; thus three slides—one of each half and one of the whole—were made from the diagram in Fig. 1. Again, two drawings can be combined into a single slide; witness Fig. 2, which was made by placing the load diagram in front of an older contour map. Two things must be kept in mind, however—plans to photograph well should be drawn with very heavy lines, and lettering should be more open than in ordinary work. With a little ingenuity lantern slides can be made to illustrate many of the engineer's points and problems.

Method of Investigating

It is intended here to discuss only cases

which lie outside of ordinary maintenance routine. When a man complains that his cellar has been flooded by water setting back from the sewer, the first move is to ascertain that the trouble is not in the drains on the complainant's own land; the second is to determine that the main sewer is in good order and free from obstruction. These first investigations can be made by the men in charge of maintenance. After the complaint has passed these first steps the City Engineer may be asked to investigate the matter further.

Occasionally, even though the private drains are in good order, the cause, or at least a remedy, lies in the design of the plumbing of the complainant's property. When a new building is built amidst old ones, with a basement deeper than those of its neighbors, or at least better finished off, the new building sometimes has troubles which could have been avoided by more careful planning of the drainage within the structure. The additional cost of a better plumbing layout would have been but an infinitesimal item in the total cost. The annoyance thus avoided would have been well worth the slight added expense. After several cases of this kind had come up we drew duplicate cross-sections of a typical building facing each other from opposite sides of an imaginary street. (See Fig. 1.) The sections showed the sewer, the laterals to the buildings, and the drain pipes inside. One section showed the drainage arranged, as has been customary at Hartford, with a single soil pipe carrying the discharges of both roof conductors and of interior fixtures. In contrast to this, in the building at the right, separate drains for roof water and for fixtures are provided all the way to the sewer. In addition, separate soil pipes are shown inside for basement fixtures and for those above, the former being fitted with a check valve. There is nothing novel about this arrangement of drain pipes, but it takes some persuasion and explanation to get the plan adopted for new buildings in neighborhoods where the sewers may be overloaded. This illustration has been used to demonstrate to the Board and to others how, by proper designing of plumbing, much future damage and annoyance to tenants may be avoided.

Outgrown Sewers Cause Trouble

As a given district becomes more thickly built up, more intensely developed, the run-off increases and the required capacity of its sewers becomes larger. This is the most frequent cause for complaints respecting existing sewers. There are sewers built a generation or more ago and as large and as deep as the conditions then warranted, which are not adequate to the needs of today. When the sewers were built, the territory which they served was but thinly built up, without cross-streets; paved roadways did not exist in any residential districts; and many conditions were far different from what one finds today. To illustrate a case in this class we prepared a couple of years ago a series of lantern slides photographed from maps of different dates showing the changes which had come over the particular district under discussion. These slides were so laid out, using selected parts of several old maps, that they each showed precisely the same area on precisely the same scale. The original maps were on various scales, the adjustment being made in photographing them. The first, a map of forty years ago, showed only two roads, a few scattered houses and the rear land cut into small farms. The district was at that time drained by a brook and its tributaries. Successive slides showed the same district at later periods, including one at about the date when the sewers in the original streets were built. At that time there were

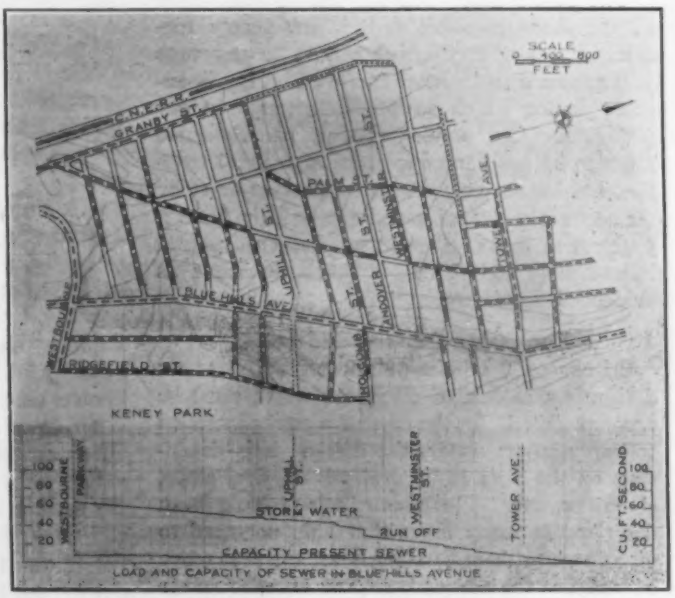


FIG. 2.—PLAN OF DRAINAGE AREA WITH DIAGRAM SHOWING RELATION BETWEEN ACTUAL CAPACITY OF EXISTING COMBINED SEWER AND THE REQUIRED CAPACITY AS FIGURED BY ORDINARY RUN-OFF FORMULAE

more houses than in the first view, but as yet only the two original roads, no cross-streets, and no indication as to the ultimate development of the area. The series continued until the last slide showed the district as it was at the date on our report, traversed by cross-streets, thickly built up, the main brook paralleled by an intercepting sewer, and the smaller tributary brook wiped off the map altogether. No wonder that the old sewers in the two original streets had become overloaded with the discharge of added branches in newer cross-streets. The contrast between the first and last slides showed how impossible it was for those who built the old sewers to provide for the needs of the present time.

Changing Character of Community Causes Overloading of Sewers

Another factor leading to sewerage trouble is the conversion of former residential streets into business sections. Not only is the run-off from a business district larger than from residential areas, but business property usually has deeper basements, and the inconvenience of inadequate sewerage is greater because of the use of basements for merchandise. The diagram in Fig. 1 can be applied to show how the first properties so converted from residence to business should protect themselves.

What Is an Inconvenience to an Old Resident Is a Nuisance to a Newcomer

The public today will not put up with some of the inconveniences with which people formerly lived—a fact which applies to sewerage just as much as to other facilities. This is another factor which sometimes enters into our problems. Old residents of a neighborhood seem to be indifferent to some occasional trouble; but let an energetic newcomer be hurt by the same old difficulty and we quickly have a problem to solve. Human nature, as displayed in sewerage complaints, is much the same as evidenced elsewhere.

Visualizing Capacity and Load

Of course, the basis of any report on sewer design is a calculated discharge which must be accommodated. In the case of a sewer intended to carry storm water, the discharge is dependent on the area to be drained, its size, slope, character, etc. These calculations have been described so many times that I do not need to give space to them here. Almost the first move in studying the adequacy of any existing sewer is to determine both the run-off which must be taken care of and the tabular capacity of the sewer in question, its outlet and its tributaries. Mere figures, expressed as so many cubic feet per second, do not carry an idea to the average man as clearly as relative quantities such as "half the needed size," or, better still, as convincingly as something which can be seen. To visualize this idea of the relation between the capacity of an existing sewer and the load which it ought to be able to carry, we prepared the chart shown in Fig. 2. The upper part of this illustration is a photograph of part of a contour map showing the sewer in question, the street through which it was proposed to build a relief sewer, its relation to other streets and sewers, etc. The lower part of the view is a loading chart, drawn on profile cloth, showing graphically the rated capacity of the present sewer and the theoretical required capacity. The diagram is placed vertically below corresponding points on the map. The present sewer in Blue Hills Avenue was built twenty-five years ago to accommodate scattered houses along that street at a time when the adjoining land was all farm property. This section has developed during the past ten years into a residential neighborhood. Most of the cross-streets have already been sewered. We wanted to make provision to relieve the sewer in Blue Hills Avenue by means of connections with proposed sewers in two cross-streets not yet sewered. This illustration was prepared to show what provision ought to be made for such relief.

Public Must Be Shown That Computations and Facts Agree

Calculations are much more effective to the public if it can be shown that the calculations agree with the actual facts. Engineers can calculate that a given sewer is or is not large enough. It is much more convincing if they can show that the sewer behaves as they figure it should. Further, since figured run-offs depend to a considerable extent on assumptions as to the proportion and effect of impervious surfaces, etc., they should be checked, when possible, by actual gagings of the flow. Gagings may also give some indication of decreased capacity at some point, due either to an unknown obstruction or to poor details at some junction or bend. Hence, any investigation of an extensive system of old sewers usually involves efforts to learn the actual behavior of the sewers in time of storm. Details of gages and gagings would take considerable space, but the following paragraph will give, in brief, an outline of some work along this line. Note that the gagings described are only efforts to estimate the storm flow, not to measure the normal dry-weather discharge.

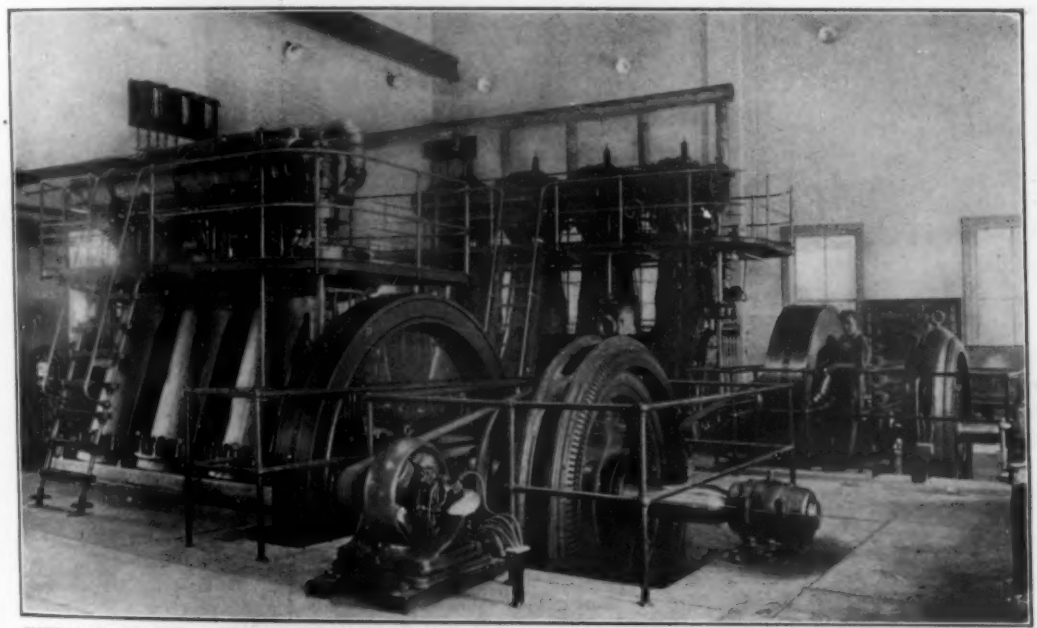
(To be continued in the November issue)

Diesel Engines Solved the Power Problem at Algona, Iowa

By J. W. Kelly

Superintendent, Municipal Light and Water Plant, Algona, Iowa

PRACTICALLY every municipality is confronted at some time with the question of power—should it manufacture its own or purchase it from a privately operated and financed organization. A number of years ago the city of Algona, Iowa, was faced with this very problem. How we have been able to successfully manufacture our own power and the problems we have had to confront in finally arriving at our present high-quality service and low-cost production, may prove interesting to other cities now facing similar power problems.



INTERIOR OF THE ALGONA, IOWA, MUNICIPAL LIGHT AND POWER PLANT, SHOWING THE FULTON-DIESEL ENGINE INSTALLED JANUARY, 1922

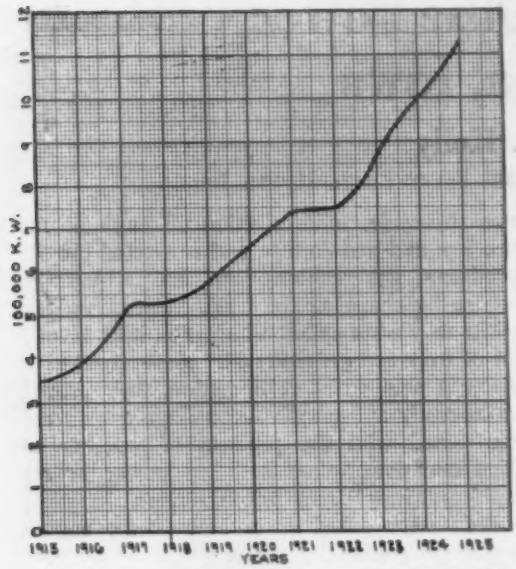
History

Until 1907, the city power load was carried by a 150-h.p. Murray-Corliss engine. At this time there was added a 150-h.p. producer gas engine. The excessive cost of operating these engines along with the uncertainty of fuel supply caused by strikes and poor freight service, and the complicated plan necessary for producing gas, made it imperative that some other means of obtaining power be found.

At that time, oil engines were gaining prominence, and after investigating, we installed two two-cycle, solid-injection oil engines, one 100 h.p. and one 80 h.p., and converted the old producer gas engine into an oil-burning engine by changing the head. These engines, while they were called oil engines, burned only oil of over 40° gravity, or kerosene (coal oil). After a few years of operation, they proved to be costly and unreliable, and again we were confronted with the problem of whether to junk our power-plant and buy power or rebuild and install new prime movers.

Bids were asked from both steam engine and diesel engine manufacturers. Before purchasing, a steam engineer and the writer were requested by the city to make a trip and observe the operating efficiencies of various steam and diesel plants comparable in size with that which we wished to install. The result of these observations was a recommendation for engines operating on the full-diesel principle, as the solution of our power problem.

A Fulton-Diesel, a 200-h.p. unit, was installed in 1917. Immediately fine results in fuel economy were apparent. In 1919 another unit, of 425-h.p., was added. All the old en-



LOAD OF THE ALGONA MUNICIPAL POWER-PLANT BY YEARS

gines were sold. The new Fulton-Diesel engine was paid for out of the profits made on the first engine installed.

A steady growth in our load necessitated the addition of a third unit, of 320-h.p., in 1921. This unit was also built by the Fulton Iron Works Company and paid for by the profits made from the plant.

Operation Costs

The reliability of these diesel engines, as we have found them, can be best appreciated when one realizes that in over nine years, or since the installation of our first Fulton-Diesel, which operates on the full-diesel, 4-cycle, air-injection principle, we have not once had a cold line from engine trouble. The first unit installed is still carrying its share of the load as efficiently and quietly as it did the day it was started.

Our load has steadily grown, as shown by the chart, while our cost of production has steadily decreased, and we have been able to make repeated reductions in our rates.

One profitable source of revenue has been realized by the sale of power to the rural districts. We have five lines supplying the surrounding farming communities. These lines are owned and maintained by those who are served. Power is delivered to them at 2,200 volts at the city limits, where it is metered. These rural lines are pushing farther and farther into the country, and, as the demand increases, the rate will be decreased.

The maintenance of the diesel engine we have found to be surprisingly low; over a period of the past four years, repairs have cost an average of only $612 on the three engines, which is approximately 64 cents per h.p. year on the horsepower installed, or about $.000535 per kw. hour generated. I believe this compares very favorably with that of a good steam plant which has operated a like number of years.

The following table shows the operating expenses for an average year, and covers the period from March 1, 1925, to March 31, 1926:

Salary and labor*	$7,980.00
Fuel oil	4,165.00
Freight on fuel oil	3,094.36
Hauling oil and fuel	227.29
Lubricating oil	388.33
Repairs	612.00
Insurance	98.00
Retirement	3,150.00
Total	$19,715.24
Kw. generated	1,141,998
Cost per kw.	.0173
Gal. fuel oil used	107,679
Kw. per gal.	10.6
Plant capacity (kw.)	626
Plant factor (per cent)	21.1

* In the item of "Salary and labor" is included the cost of labor necessary to maintain the entire distribution system as well as the plant force; this, of course, should not be charged to the operating cost of the engine. However, these items are kept together on our books and it is difficult to separate them.

The large item, "Freight on fuel oil," is caused by our geographical location. Another large item is "Hauling oil and fuel." The power-plant is not located on a railroad siding, and all fuel or oil must be trucked. Even with these handicaps and with the engines operating at a plant factor of only 21.1 per cent, we are able to manufacture power at 1.73 cents per kilowatt-hour, which is satisfactory.

Our present rates are given below. We have planned to reduce these again soon.

Light			
First 30 kw.	11c	Next 300 kw.	8c
Next 70 kw.	10c	All over 600 kw.	7½c
Next 200 kw.	9c		

Power			
200 kw.	5c	Next 2,000	3½c
Next 300	4½c	All over 3,500	3c
Next 1,000	4c		

Heat			
60 kw.	5c	Minimum, $2.50 per month	
All over 60	4c		

Since the installation of the first Fulton-Diesel, our plant has consistently shown a good yearly profit. We have been able to make many additions and improvements through these profits, beside building a new electric light and power plant office, which also houses the City Clerk's office and the Fire Department. This office building cost approximately $16,700. We have also been able to build up a reserve fund with which to purchase new engines; this will be needed in the near future, as our load is increasing quite rapidly, having doubled itself in the past five years.

A Supreme Court Discusses Municipal Liability for Negligence

(From the Decision of the Supreme Court of Wyoming in the Recent Case of Ramirez v. City of Cheyenne, 241 Pacific Reporter 710)

THERE is an oft-repeated general principle that a municipal corporation has powers of two kinds: first, those that are governmental or public, in the performance of which there is no implied common-law liability for negligence; and, second, those that are corporate or private, for the negligent performance of which the city is subject to the same liability as individuals or business corporations. This division of the powers of municipal corporations for the purpose of determining their tort liability is recognized by most of the courts of this country, but has never received more than incidental notice by this court.

The cases on which it is supposed to be based underwent a thorough examination by Mr. Chief Justice Gray, in 1877, in the case of Hill v. Boston, 122 Mass. 344, where it was said at page 369 (23 Am. Rep. 332):

"The result of the English authorities is that when a duty is imposed upon a municipal corporation for the benefit of the public, without any consideration or emolument received by the corporation, it is only where the duty is a new one, and is such as is ordinarily performed by trading corporations, that an intention to give a private action for a neglect in its performance is to be presumed."

Of this opinion Judge Dillon in his work on Municipal Corporation (5th Ed.) § 1643, remarks:

"That this general view of the restricted liability of municipal corporations is sound there can be little doubt."

Operation of Playground by City Held Not to Be Governmental Function to Extent of Rendering City Immune from Liability for Negligence

In the decision from which the accompanying discussion is quoted, the Supreme Court of Wyoming held that whether the city of Cheyenne was negligent in maintaining an unsafe swing in a municipal playground, and whether a child killed in using the swing was guilty of contributory negligence, were questions of fact to be determined by a jury. The Appellate Court held that a verdict should not have been directed by the trial judge in favor of the defendant city on the theory that the city was not liable for its negligence.

The opinion written by Mr. Justice Kimball contains an exhaustive discussion of the authorities and decisions bearing on the question of municipal liability for negligence. Because of the importance of this complex subject to the administrative and legal departments of municipalities, the discussion and decision, with the exception of the opening paragraphs, are here published in full. (The subheads have been inserted by The American City.)

Little or No Support in English Precedents

It seems, however, in spite of the high authority of Hill v. Boston, and the many other cases in this country to the same effect, that the exemption of municipal corporations from liability for affirmative acts of negligence finds little or no support in English precedents. The cases in that country, following Russell v. Men of Devon, 2 T. R. 667, make a rather unscientific and bothersome distinction between non-feasance and mis-feasance, and, in the absence of a statute imposing liability, public bodies performing public acts from which they derive no revenue are exempt from liability in cases of non-feasance only. (Cowley v. Newmarket Local Board, [1802] A. C. 345; Shoreditch v. Bull, 90 L. T. [N. S.] 210; Maguire v. Liverpool Corp., [1905] 1 K. B. 767; McClelland v. Manchester Corp., [1912] 1 K. B. 118; 14 Juridical Rev. 158; 30 Law Q Rev. 276, 415.) It is said in Pollock on Torts (12th Ed.) pp. 59, 60, on authority of Mersey Docks Trustees v. Gibbs, L. R. 1 H. L. 93, that:

"Where bodies of persons, incorporated or not, are intrusted with the management and maintenance of works, or the performance of other duties of a public nature, they are in their corporate or quasi-corporate capacity responsible for the proper conduct of their undertakings no less than if they were private owners; and this whether they derive any profit from the undertaking or not."

It has been assumed in England, however, that a municipal corporation would not be liable for misfeasance of its police officers, and this has been supposed to be so because the police perform public duties having no peculiar local characteristics. (Wills. J., in Stanbury v. Exeter Corp., [1905] 2 K. B. 838, 842). This is something like the American doctrine.

Grounds of Distinction Challenged in American Courts

The rule distinguishing between governmental and private powers for the purpose of determining the tort liability of municipal corporations may be of doubtful origin, and hard to justify on any of the prinicples of the law of agency and torts. The grounds for the distinction have been seriously challenged in recent years. The Supreme Court of the United States refused to apply it in a case under maritime law. (Workman v. New York, 179 U. S. 552, 21 S. Ct. 212, 45 L. Ed. 314.) Re-

lying largely on what was said in the majority opinion in Workman v. New York, the Supreme Court of Ohio in Fowler v. Cleveland (100 Ohio St. 158, 126 N. E. 72, 9 A. L. R. 131), held a city liable for an injury caused by the negligent operation of a fire-truck, although it is held almost without dissent, and had been held in Ohio, that the maintenance of a fire department is a governmental matter. Since the decision of Fowler v. Cleveland there has been in legal periodicals a flood of adverse criticism of the rule of immunity. (34 Harv. L. R. 66; 34 Yale L. J. 1, 129, 220; 4 Ill. L. Q. 28; 33 Misc. L. R. 325; 20 Columbia L. R. 772.) While these criticisms may have raised a serious doubt both as to the wisdom and the foundations of the rule, the doubt has not found much expression in judicial decisions. After the decision of Fowler v. Cleveland, the case of Workman v. New York was expressly limited in its application to cases under maritime law, and the distinction between public and private powers of the District of Columbia recognized. (Harris v. District of Columbia, 256 U. S. 650, 41 S. Ct. 610, 65 L. Ed. 1146, 14 A. L. R. 1471.) Later, Fowler v. Cleveland was overruled. (Aldrich v. Youngstown, 106 Ohio St. 342, 140 N. E. 164, 27 A. L. R. 1497.)

While we are not unmindful of the force of the criticism of this rule of immunity, we think the rule has become so well fixed as a part of the law of municipal corporations of this country that it is not to be disregarded by the courts until the Legislature declares a different policy.

Lack of Uniformity in Decisions

A practical objection to the rule is the astonishing lack of uniformity in decisions of cases in which it has been applied. Powers held to be governmental or public in one jurisdiction are held to be corporate or private in another, and it has often been said that it is impossible to state a rule sufficiently exact to be of much practical value in deciding when a power is public and when private. (Dillon, supra, § 1625; Johnston v. Chicago, 258 Ill. 494, 101 N. E. 960, 45 L. R. A. [N. S.] 1167, Ann. Cas. 1914B, 339; Lloyd v. New York, 5 N. Y. 369, 55 Am. Dec. 347.) The conflict in the decisions is nowhere more pronounced than in cases of negligence in the maintenance of public parks and playgrounds, which are generally conceded to stand on the same footing. These cases are collected in a note to Emmons v. Virginia, 152 Minn. 205, 188 N. W. 561, as reported in 29 A. L. R. 860, where it is said that a majority of the cases support the view that a municipality in maintaining a public park is engaged in a governmental activity. There are, however, so many courts holding to the minority view that the mere question of the number of decisions one way or the other can have but little weight. From an examination of the more recent cases we find Utah holding to the rule of immunity and West Virginia to that of liability. (Alder v. Salt Lake City, 64 Utah. 568. 221 P. 1102; Warden v. City of Grafton [W. Va.] 128 S. E. 375.) It would almost seem that the rule of immunity has been given or refused application to attain the result that has appeared to individual judges to be most convenient. However unsatisfactory this may be to those who wish for consistency in the law, it is recognized as the method by which many principles of the common law have been established. (Holmes, Common Law, p. 1.) That the law as applied to a particular situation produces different results in different jurisdictions is, to say the least, unsatisfactory. We cannot but hope that the Legislature may turn its attention to the subject of municipal liability and tort and declare a policy for future guidance.

If, in declaring the rule to control this case, we felt free to be guided solely by our intuitions of public policy, we might say, without more ado, that the city should or should not be liable under the facts that might have been found by the jury. We have said, however, that we cannot disregard the established rule that the courts of this country try to follow in determining the tort liability of municipal corporations. If the city in maintaining the playground device had been engaged in an activity which generally, or by the clear weight of authority, has been classed either as governmental or private, we probably would be content to decide the case without looking for other grounds for the decision. In classifying the activity here involved and determining a policy of liability or immunity, we think, in the absence of any generally accepted guide, we should take note of some exceptions to the rule of immunity, and give consideration to some other matters that should influence public policy.

Liability for Defects in Highways

The most pronounced exception is in cases of failure to keep highways in repair. The maintenance of highways would seem to be a governmental or public function, and is usually so recognized, but most of the courts of this country, on one ground or another, have held cities liable for negligence in failing to keep their streets in a safe condition for travel. While such liability is sometimes declared by statute, it is often imposed in the absence of statute, and in the latter class of cases the right to damages is usually sustained as an exception to the general rule that exempts the city from liability for negligence in the performance of governmental or public duties. In cases of parks and playgrounds, some of the courts holding the city liable do so for the same reasons that apply to cases of highways. Other courts refuse to extend the exception as to streets to cases of parks and playgrounds. In this state we have had no case involving the liability of a city for defects in highways. Kent v. Cheyenne, 2 Wyo. 6, decided without opinion, involved the question of the city's liability for permitting a nuisance in a street. It was held that there was no liability. But the probable ground for that decision was the exemption of the city from liability for failure to enforce an ordinance, or for failure to abate a nuisance which it had not created.

Liability for Creating or Maintaining a Nuisance

It is often said that a city, even though acting in a governmental capacity, cannot escape liability for creating or maintaining a nuisance. (Wood on Nuisances [2d Ed.] § 748; Hughes v. City of Fond du Lac, 73 Wis. 380, 41 N. W. 407; City of Winona v. Botzet, 169 F. 321, 332, 94 C. C. A. 563, 23 L. R. A. [N. S.] 204; Miles v. Worcester, 154 Mass. 511, 28 N. E. 676, 13 L. R. A. 841, 26 Am. St. Rep. 264; Chattanooga v. Dowling, 101 Tenn. 342, 47 S. W. 700.) This should not, perhaps, be classed as an exception to the rule exempting a city from liability for negligence, for common-law negligence does not enter into cases of true nuisance. The liability of municipal corporations for damages for nuisances seems generally to be recognized where property has been

injured, but not so often where the damage was to the person. Yet the maintenance of a dangerous thing in a public place has been referred to as a nuisance. (Tarry v. Ashton, 1 Q. B. Div. 314.) In Maxwell v. City of Miami, 87 Fla. 107, 100 So. 147, 33 A. L. R. 682, the reckless operation of fire-trucks on the public streets was called a nuisance. Machines that allure children into danger have often been termed "attractive nuisances." It has been said that "nuisance" is a good word to beg a question with. Its use in relation to acts that give rise to private actions for damages might well be confined to infringements of rights appurtenant to real property. (1 Street, Foundations of Legal Liability, pp. 211, 230.) In the case at bar the plaintiff did not sue on the theory that the swing in its defective condition was a nuisance, and it is unnecessary for us to say whether or not it might have been so classified. We will say in passing, however, that it is not unlikely that, if a city should persist in maintaining a playground device in a defective condition in a public place, where it would be a danger to children who used it, some law might be found to compel the city to remove or repair it.

Cases of "Active Wrongdoing"

In New Jersey it is held that the exemption of municipal corporations from liability for negligence in performance of public duties does not extend to cases of active wrongdoing chargeable to the corporation. (Olesiewicz v. Camden [N. J. Err. & App.] 126 A. 317; Kehoe v. Rutherford, 74 N. J. Law, 659, 65 A. 1046, 122 Am. St. Rep. 411; Doran v. Asbury Park, 91 N. J. Law, 651, 104 A. 130.) In Hart v. Freeholders of Union, 57 N. J. Law, 90, 29 A. 490, it is said that there is no reason arising out of public policy why a municipal corporation should be shielded from liability when a private injury arises from wrongdoing acts as distinguished from mere negligence. We fear that the term "active wrongdoing" is of doubtful meaning. The cases show, however, that the courts of New Jersey refuse to grant absolute immunity to municipal corporations in the exercise of governmental powers.

We have already referred to the so-called "turntable" or "attractive nuisance" cases. Under the doctrine of those cases the alluring machine, or other attraction, is considered an invitation to the child, who then has the rights of an invitee, or, if not that, the allured child is considered a licensee and the dangerous machine a trap. Except for this doctrine, the child in such cases would be a trespasser. There is, of course, no contention that the child in the case at bar was a trespasser, and there is no occasion to invoke the doctrine of the attractive nuisance cases to fix his status. We call attention to the doctrine as illustrating the policy of the law to find a way to protect children from artificial perils.

When the policy of distinguishing between governmental and private functions of municipal corporations took root in the law, the activities of public bodies were much more limited than they have since become. The leading case of Russell v. Men of Devon, 2 T. R. 667, involved a defective bridge, and it was held that the unincorporated inhabitants of the county could not be sued for damages caused by their failure to keep the bridge in repair. Other cases arose in which it appeared that the public body was obtaining revenue from the exercise of their power, or acting as a substitute for the ordinary business or trading corporation, and in such cases liability for negligence was imposed. (Scott v. Manchester, 2 H. & N. 204; Mersey Docks Trustees v. Gibbs, L. R. 1 H. L. 93.)

Services Rendered by Bodies Administering Public Charity

It has since been assumed that all duties of municipal corporations are performed either as a substitute for the state and for the benefit of the public in general, or as a substitute for business corporations and for the benefit of the municipality. In the performance of the first class of duties the city is immune as the state would be, and in the other it is liable as a business corporation would be. Lately there has come to be recognized a kind of service to which there is attached neither the immunity of the state nor the liabiliyt of business iorporations. This is the service rendered by bodies administering public charities. To such bodies the law as established in many jurisdictions, including ours, grants a partial exemption from tort liability. The exemption, we understand, applies where the charity is sought to be charged with the negligence of its employees, bot does not affect its liability for failore to perform its personal, non-delegable duties, such as the duty of using care in selecting its employees and in keeping its premises safe for invitees. (Williams v. Union Pacific R. Co., 20 Wyo. 392, 124 P. 505; Bishop Randall Hospital v. Hartley, 24 Wyo. 408, 415, 160 P. 385, Ann. Cas. 1918E, 1172; Union Pacific R. Co. v. Artist, 60 F. 365, 9 C. C. A. 14, 23 L. R. A. 581; Hewett v. Association, 73 N. H. 556, 565, 64 A. 190, 7 L. R. A. [N. S.] 496; Hearns v. Waterbury Hospital, 66 Conn. 98, 33 A. 595, 31 L. R. A. 224; McInerny v. St. Luke's Hospital, 122 Minn. 10, 141 N. W. 837, 46 L. R. [N. S.] 548; Bruce v. Central M. E. Church, 147 Mich. 230, 110 N. W. 951, 10 L. R. A. [N. S.] 74, 11 Ann. Cas. 150; Hordern v. Salvation Army, 199 N. Y. 233, 92 N. E. 626, 32 L. R. A. [N. S.] 62, 130 Am. St. Rep. 889.) A charitable institution is also liable for damages caused by a nuisance. (Love v. Nashville, etc., Inst., 146 Tenn. 550, 243 S. W. 304, 23 A. L. R. 887.)

If the service that a municipal corporation underof the community partakes of the nature of services that would ordinarily be performed by charices that would ordinarily be performed by charitable or eleemosynary institutions, and is such as would not ordinarily be performed by the state or business corporations, we think public policy requires for the protection of the children of the state that the municipality be held to no less accountability for its own negligence than would be the case if the service were performed by a charity. That policy would seem to be consistent with the rule that grants a larger immunity when the city is considered as acting as a substitute for the state, and imposes a larger liability when it is considered as acting as a substitute for a business corporation. The analogy between an institution conducting a public charity and a municipal corporation when engaged in a similar activity has been noted elsewhere. (Fire Ins. Patrol v. Boyd, 120 Pa. 624, 15 A. 553, 1 L. R. A. 417, 6 Am. St. Rep. 745; Scibilia v. Philadelphia, 279 Pa. 549, 124 A. 273, 32 A. L. R. 981.) In the case last cited it is said that:

"A municipality is entitled to the benefit of the same rule of exemption that would apply to work

of a similar kind when rendered by a public charity. In other words, it is the character of the service involved which must serve as the criterion to govern controversies such as the one at bar."

Municipal Playgrounds Analagous to Public Charities

The maintenance of free municipal playgrounds is a comparatively new municipal activity, and one in which neither the states nor business corporations are likely to engage. Such playgrounds might be, and probably are in some instances, maintained by benevolent persons or by corporations formed for the purpose. We think, therefore, that the city in maintaining the playground device must be considered as acting as a substitute for a charitable or benevolent body performing a public service. In the absence of any policy of immunity declared by the Legislature, we cannot hold that it has intended to create irresponsible agencies for such a purpose. Cities inviting children to playgrounds where it maintains devices for their use in play must assume at least those duties and liabilities that would be assumed by a charity doing the same thing. Though it be not liable under the doctrine respondeat superior for the negligence of its servants, it is liable for negligence in the performance of its non-delegable duties, among which is the duty to use reasonable care to make the place safe for children who are there by invitation. The controlling principle is stated in Cooley on Torts, p. 605, thus:

[Where one] "expressly or by implication invites others to come upon his premises, whether for business or for any other purpose, it is his duty to see that he is not inviting them into danger, and to that end he must exercise ordinary care and prudence to render the premises reasonably safe for the visit."

We think the child in this case was an invitee under the foregoing principle. (See Davis v. Central Congregational Soc., 129 Mass. 367, 37 Am. Rep. 368.) This duty to invitees goes beyond the common doctrine of responsibility for servants, and is non-delegable. (Pollock on Torts [12th Ed.] p. 516; Herman v .Board of Education, 234 N. Y. 196, 137 N. E. 24, 24 A. L. R 1065; Silverton v. Marriott, 61 L. T. [N. S.] 61; 6 Labatt, Master & Serv. § 2500.) The rule as to non-delegable duties applies to corporations, who can act only by its agents, as well as to natural persons. (4 Labatt, supra, § 1485.)

Under the foregoing principles the jury would have been warranted in finding that the death of the child was caused by actionable negligence on the part of the defendant without contributory negligence on the part of the child, and a verdict should not have been directed. The judgment will be reversed and the case remanded for a new trial.

POTTER, C. J., and BLUME, J., concur.

Roadside Advertising and Unkempt "Hot Dog" Stands Opposed by American Automobile Association

A NATIONAL survey of the problem of roadside advertising and a nation-wide campaign to throw restrictions around the operations of "hot dog" venders and their kin along the highways, are being undertaken by the American Automobile Association and are of interest to all motorists.

In a letter sent out in September from A.A.A. National Headquarters, highway officials in every state of the Union were earnestly urged to formulate plans whereby the "thousands of unwashed, unpainted, and unsanitary hot dog stands and lunch counters" would be brought under decent regulation. The statement was signed by President Thomas P. Henry, who made his appeal to state highway officials in the name of the 841 motor clubs affiliated with the national organization. The letter said, in part:

"In recent years the country has awakened to the importance of the work of sign-posting our highways, this being one of the big factors in the national effort to promote safety. Needless to say, the states have made great strides in this respect. At the moment, however, there is danger that much of this vital work will go for nothing because of the prevalence of advertising material side by side with legitimate warning and direction signs. In thousands of instances this wayside advertising deliberately imitates the warning signs put up for the protection of the motorist. I think you will agree with me that the practice is one fraught with danger, not to mention the confusion and annoyance. May we not suggest that it is high time some plan was undertaken whereby advertising material may be placed further from the center of the highways than the warning and direction signs, in order that the latter may be easily and quickly differentiated?

"While on the subject, let me refer to another situation which is equally deserving of your serious attention. In recent years our road builders have paid a great deal of attention to the beautification of the highways, but here again the effort has been entirely lost because of a condition that has grown up in the wake of motor touring. No one can travel on our highways today without being appalled at the desecration of good taste and plain civic manners by the thousands of unwashed, unpainted, unsanitary hot-dog stands and lunch counters that infest our roads. This disgraceful appearance is extended by an unlicensed posting of signs of every size and color upon trees, fences, poles, rocks and other projections between the aforesaid stands and the counters. This, we believe, is a situation that can be cured, because ordinarily these stands are licensed to do business and it is reasonable to suppose that licenses can be granted under such restrictions as will, to some extent, protect the landscape from the depredations of the hot-dog merchant.

"There is an urgent necessity for a clean-up along the highways. It is high time that something was done to eliminate other eye-sores in the form of dumps and untenanted and tumble-down shacks that are all too frequently sprinkled along some of our main thoroughfares. We appreciate that this would require cooperation between property owners and state authorities, but we are confident that such cooperation would result in a forward step in highway beautification."

New Rapid Sand Filtration Plant, Washington, D. C.—Part I

By Philip O. Macqueen

United States Assistant Engineer, Washington, D. C., District

AMONG the larger cities in the United States, Washington, D. C., is exceptionally fortunate in having an abundant and excellent supply of water, not only near the city but at an elevation of over 100 feet above its business section. This is quite unusual. Large cities such as Chicago, Cleveland, and St. Louis on the Great Lakes and the Mississippi River, and also Philadelphia on the Delaware River, have plenty of water, but they have sewage disposal and high pumping costs to contend with. New York and Los Angeles have aqueducts over 100 miles long. The water-supplies of Baltimore and Boston are not far from the cities, but the amounts available are far from being abundant. Washington, however, has an unlimited supply of relatively pure water only 9 miles from the city limits, and, moreover, the intake at this point is at the head of a series of falls and rapids in the river, so that a large part of the city can easily be supplied by gravity. This situation comes very close to being ideal as far as water-supply is concerned.

The Potomac River, which is the source of supply for the city, is one of the principal streams in the eastern part of the United States, ranking between the Susquehanna and the Delaware Rivers in point of size. The area of its watershed above the intake of the aqueduct is 11,050 square miles, its total length is 450 miles, and its average discharge is 11,900 cubic feet per second, or 8,000 million gallons per day. In appearance the water is, as a rule, quite

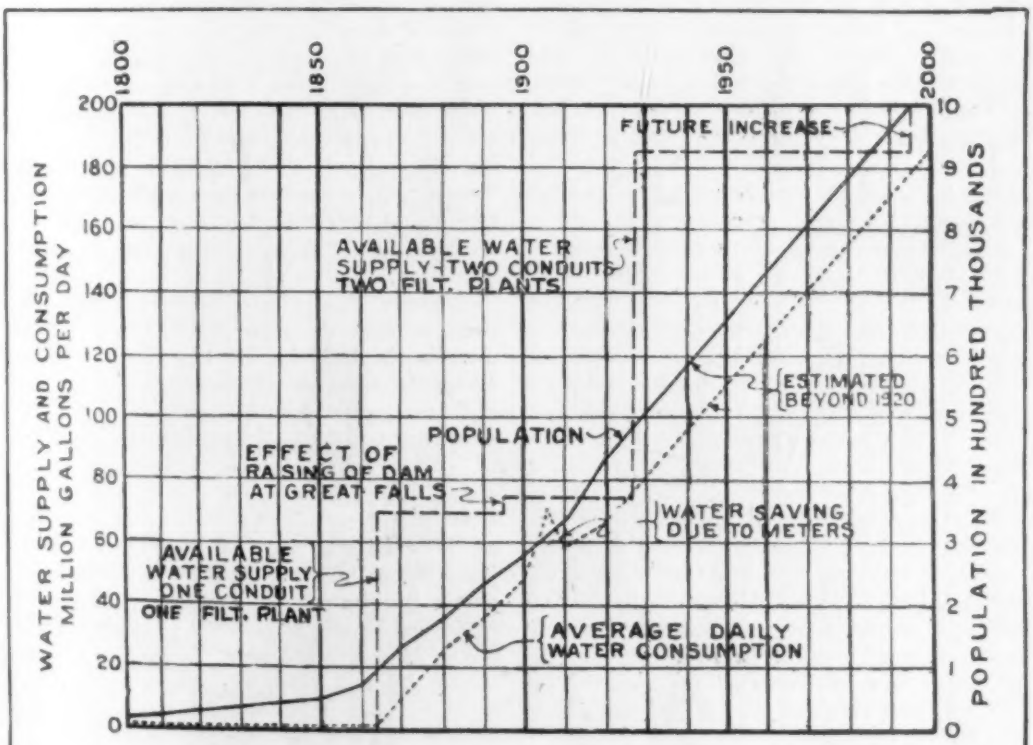


FIG. Nº 1. POPULATION AND WATER CONSUMPTION CURVES FOR THE DISTRICT OF COLUMBIA

muddy, but the turbidity is not by any means as high as that of the Ohio River. This relatively small amount of mud is easy to filter out and in some cases is a help rather than a hindrance, as it promotes rapid sedimentation with aluminum sulphate. The population on the watershed is small, and for a distance of 30 to 40 miles above the intake the urban population consists mostly of small farms. Frederick, Md., the nearest large town, is 45 miles above the intake. This means that Washington is free from any decided pollution of its source of water-supply.

The following table is given in order to show in a general way the character of the water:

POTOMAC RIVER WATER—AVERAGE ANALYSIS

Item	Raw Water	Settled Water	Filtered Water
Maximum turbidity	4000	100	3
Average turbidity	200	20	0
Hardness p. p. m.	63.0	62.5	62.5
Chlorine p. p. m.	3.1	2.8	2.6
Bacteria per c. c. (average)	4000	400	8
Bacterium Colon per c. c. (ave.)	4	0.1	0.002

Construction of the present or old water system of Washington was begun about 70 years ago. The principal features consist of an aqueduct 11 miles long, a tunnel 4 miles long under the city, three large storage or settling reservoirs, and two high-service reservoirs, an 80-million-gallon-per-day slow sand filtration plant, a large steam-operated pumping-station, and the distribution mains. A low overflow dam 2,800 feet long across the river, at elevation 150.5, at the head of the falls, is provided at the intake of the aqueduct in order to have the conduit flowing full even when the river is low. The slow-sand filtration plant, which was built about 20 years ago, is one of the model plants of the country and is giving excellent service. A full description of this plant is given in Vol. 57 of the Transactions of the American Society of Civil Engineers, by its designing engineers, E. D. Hardy and Allen Hazen. All structures except the pumping-station and distribution mains, which are under the jurisdiction of the District of Columbia, were constructed by the War Department, Office of Chief of Engineers, which also has charge of the operation and maintenance of aqueduct and filtration plant. Capt. M. C. Meigs, Corps of Engineers, was in charge of early construction work in 1854, and Col. A. M. Miller was in charge of the construction of the present slow sand filtration plant, which was completed in 1905.

New Supply

Studies for increasing the water-supply for Washington were begun about 40 years ago. The growth of the city and its suburbs was unusually rapid, and this indicated the necessity of the additional supply. Many investigations were made, and it was finally decided to build a new aqueduct parallel to the present aqueduct and a new rapid sand filtration plant, also a power-plant and various pipe lines and reservoirs, at a total estimated cost of about $9,000,000. Work on this project was begun in 1921 and will be completed in 1927. It is planned to have the old and new filtration plants operate together and supply water not only for the District of Columbia but also for many of the outlying suburbs.

It was decided to locate the new filtration plant near Dalecarlia reservoir, which is one of the largest raw-water settling and storage reservoirs of the system. This location permitted the filter plant to be built on Government property and also to easily draw its raw water by gravity from the Dalecarlia reservoir. A further advantage was the nearness of this site to a steep bank, 150 feet high, above the Potomac River. This provided an excellent location for a 2,400-Kw., hydro-electric power-plant which can utilize all surplus water which the old and new conduits, working in parallel, can bring down by gravity from Great Falls. Dalecarlia storage reservoir, with its capacity of about 100,000,000 gallons, will act both as a forebay and a settling reservoir. The power-plant will furnish electrical energy required to pump the filtered water from the new filtration plant to all high-service areas in the District. Low-service areas will be supplied by gravity from the present slow sand filtration plant, which is about 6 miles away from the new plant.

Economy, flexibility of operation, and compactness were the three factors given special attention in designing the new filtration plant. These three are closely related, and in reality each is engendered by the other two. Compactness was practically forced into the question of design by topographic conditions. The United States owns a large area of land around Dalecarlia reservoir, but only about 10 acres of this land was level enough for a filtration plant layout. This level tract was practically cut in two by a local electric car line which could not be eliminated. The best answer to the problem was to move the car line slightly to one side and group the various units of the plant as close together as possible. An unusually compact layout and also considerable economy resulted from this arrangement. Separate walls were eliminated, water passages were shortened, and all buildings were placed under one roof. The control chamber was placed under the floor of the head house, which

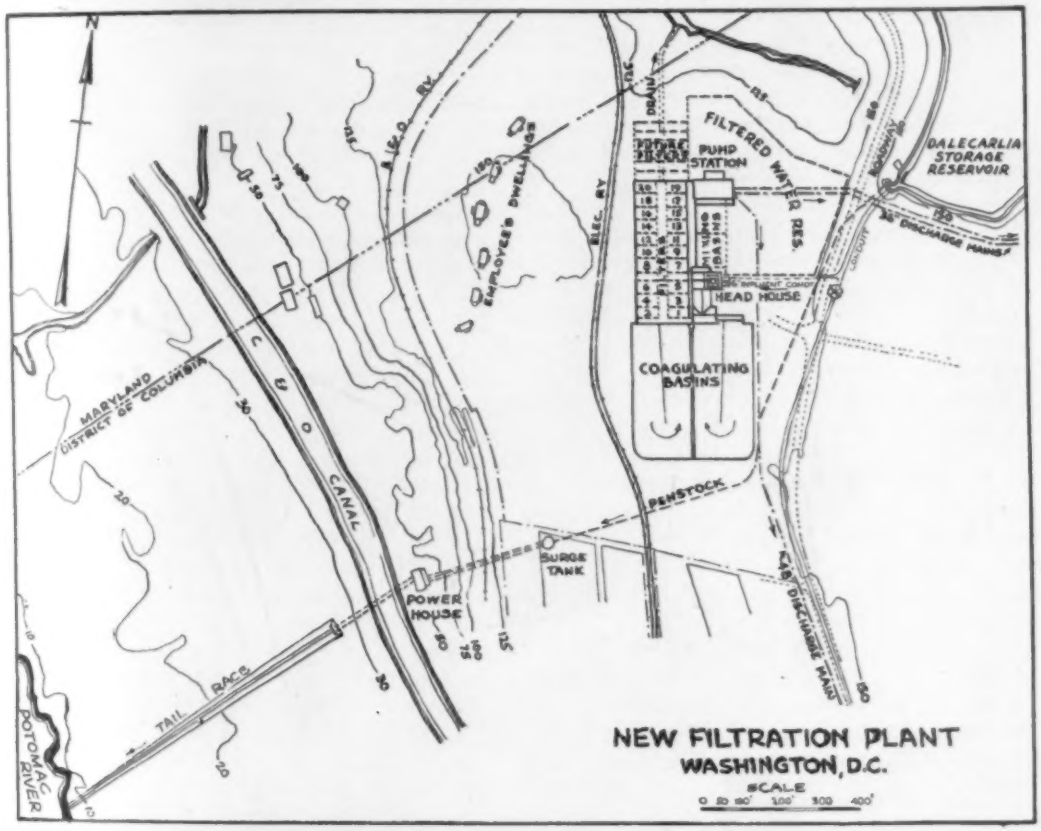
is a very convenient location and which led to flexibility of operation. The filtered-water reservoir was located in a small valley adjacent to the filters. The pumping-station was difficult to locate but was finally placed in the corner of the filtered-water reservoir near the filters.

A careful subsoil survey of the entire area of the filtration plant was made as soon as the exact site of the plant was selected. In general, it was determined that the various structures would rest on either solid red or yellow clay or a mixture of clay and rock. Borings indicated that hard rock would be from 10 to 20 feet below the lowest principal foundations and would be encountered in only a few places. Total earth and rock excavations for the plant amounted to about 110,000 and 1,000 cubic yards, respectively.

It was decided from inspection that the solid clay was capable of sustaining a load of 2 tons per square foot, and this figure was not exceeded in the designs. The heaviest load in the construction will be the head-house tower, which is about 150 feet high and contains the large bauxite storage bins. The weight of the structure will be approximately 3,000 tons, and it is supported on a heavily reinforced concrete mat, 49 feet square and 4 feet thick. As the site of the plant is 150 feet above the Potomac River, the soil in general is well drained, and very little trouble was experienced with ground water.

Control Chamber

Raw water for the filtration plant flows by gravity from the Dalecarlia storage reservoir, which is only about 600 feet away. The water enters the plant through a 6-foot diameter concrete conduit and passes first through the control chamber. This structure is a compact



series of sluice-gates and intersecting water passages located near the central point of the filtration plant, and it is similar in a general way to the cross-connection gate-houses found in larger filtration plants. Treated water, settled water, and filtered water all pass through separate passages of the control chamber, thus providing the limit of flexibility. In case of necessity the treated water can be passed directly to the settling basins or the filters; the water from the mixing basins can be passed directly to the filters, or the raw water can be passed directly to the filter-water reservoir and the pumping-station. The necessity of such extreme in operation is, of course, remote but by no means impossible.

An equally important function of the control chamber is to provide a central point for the application of alum and chlorine. The alum solution can be applied to the water before and after passage through the mixing chambers and also to the settled water before it passes through the filters, or, if desired, the dose can be divided so that a small extra dose of alum can be added to the water at any stage. This unusual flexibility is expected to be of value in obtaining the best results in the process of coagulation. The chlorine also can be applied to the filtered water or raw water at the control chamber. On account of the central location of the control chamber, the channel feed lines are extremely short. With the mixing chambers operating in series, the alum feed line is only about 10 feet long, and the branches of the other water passages are only about 20 feet long. The chlorine line is 50 feet long. These relatively short lines will simplify chemical feed operation considerably.

When the mixing basins are operated in parallel, the alum will be applied at a small gate chamber on the raw water influent conduit about 300 feet from the control chamber, so that the solution will be evenly divided before it reaches the mixing basins.

Mixing Basins

After the alum is applied to the raw water, it flows to the two mixing basins. These basins, 80 feet square and 18 feet in depth, are fitted, with baffles of the "around the end" type, which will be used for thoroughly combining the chemicals with the raw water. The baffles will be constructed of ⅞-inch tongue-and-groove lumber, braced throughout with 4 x 4-inch struts, so as to support the thrust due to the maximum loss of head. Each basin will contain 20 passages, 4 feet wide and 80 feet long, making a total travel of 1,600 feet per basin. Provision is made for using the basins either in series or in parallel, and further flexibility of operation is provided by an extra effluent gate near the half-way flow point in each basin.

Mixing periods of 8, 14, 19 and 27 minutes, with a velocity of 2 feet per second, can be obtained with a flow of 80,000,000 gallons per day and with the basins operating in series. With the basins in parallel and the same flow, the mixing periods can be made 14 or 27 minutes, with a velocity of 1 foot per second. Normal losses of head under these conditions will be from ½-foot to 2 feet. With flows of 60,000,000, or 40,000,000 gallons per day, mixing periods will be lengthened and losses of head decreased.

Settling Basins

From the mixing basins the water flows through a 5 x 9-foot concrete duct, about 200 feet long, to the two coagulating or settling basins, which are located at the south side of the filtration plant. These two basins are open concrete structures 333 feet long, 150 feet wide, and from 17 to 12 feet deep, and are separated by a substantial concrete dividing wall. Each basin is provided with a light concrete baffle wall which causes the water to travel the full length of the basin and then return to a point opposite the influent. The baffle wall is constructed on an angle of about 5 degrees towards the central dividing wall, which will tend to cause the water to move more slowly at the half-way and end points of its flow in the basin. Experiments made at Baltimore indicate that this arrangement will facilitate sedimentation.

Water will enter each basin at one end near the bottom through four sluice-gates 48 inches square, and will then be deflected upwards with wooden baffles. Five sluice-gates of the same size are provided for the effluent.

When the basins are operating in parallel, which will be the normal condition, and the flow is 80,000,000 gallons per day, the settling period will be approximately 3 hours and the velocity of the flow will be 3 feet per minute. With a flow of 40,000,000 gallons per day, which will be used for a good many years, the settling period will be about 6 hours and the velocity 1½ feet per minute. The sedimentation periods can be shortened if desired by passing the water through the dividing wall, which is constructed with a hollow core.

The floors of the basins have slopes of 10:1, which will facilitate cleaning. Pressure lines with 2½-inch hose connections are provided at suitable intervals for washing, also an 18-inch low-pressure flushing line with 10-inch gate-valve outlets 50 feet apart. One basin can be cleaned while the other is in service, thus avoiding shutting down the plant.

NOTE: This detailed description of the development and construction of the new vast water-supply project for the Nation's Capital will be continued in the November issue. The second part will take up the filter building, pumping-station, filtered-water reservoir, the use of ducts to replace pipes, the wash-water reservoir, coagulants, hydroelectric plant, and the architectural treatment of the plant.

A Campaign for Clean and Safe Milk

With Three Objectives:

1. To stimulate the production and distribution of abundant, clean and safe milk
2. To center the responsibility for such production and distribution on dairymen, milk dealers, and state and local dairy and health officials
3. To promote increased consumption of milk after reasonable assurance of its safety

THE accompanying statement by Dr. S. J. Crumbine, General Executive of the American Child Health Association, sets forth with unusual force and precision the general situation with reference to the milk supply of a community. No longer is there any involved discussion as to the necessity of a protected milk supply. There is, however, a very vital need for determining not only that our communities have the means of protecting this food supply but that these means are actually in operation. The mere existence of a pasteurization plant within the community too often becomes an occasion for unwatchful waiting. Pasteurization is not the automatic passing of milk through a mechanical contrivance—it is the outcome of intelligent use of apparatus in the manner indicated by Dr. Crumbine.

Pasteurized Milk Is Safe Milk

The enforcement of the national and state food and drug laws have practically eliminated the grosser and dangerous forms of adulteration of foods and drugs and made a new standard for truthfulness of statement on labels.

The one outstanding exception to the accuracy of this general statement is that of milk; for a considerable proportion of the nation's milk supply is still produced and distributed under unsanitary conditions, and is potentially dangerous.

Objectively, clean milk does not necessarily imply safe milk. Clean milk is whole milk produced from healthy cows, under such controlled sanitary surroundings and conditions as will safeguard the milk from contamination by any form of dirt or dangerous organisms.

Safe milk is clean milk that has been rendered absolutely safe from any possibility of dangerous contamination from animal or human sources by heating every drop to a temperature of 145 degrees F. and holding it at that temperature for 30 minutes, and then rapidly cooling and bottling it in sterile bottles. Only properly constructed and properly operated pasteurization apparatus can meet these essential heating and holding requirements which insure absolute safety. This is known as pasteurized milk. Pasteurized milk is safe milk.

The clean and safe milk campaign is an indispensable part of the great drive to further reduce infant mortality, occasioned by diarrhea and enteritis, and to promote a greater consumption of milk by people, especially the undernourished.

—S. J. CRUMBINE, M.D.

The wealth of a community, in the last analysis, rests upon the well-being of the men, women, and children within its confines. Whatever challenges this state of being endangers the whole social fabric. The future of every commercial and industrial institution is interwoven with the present status of the population, especially that of the children. Very naturally, then, it becomes the concern of every civic enterprise, especially public bodies and chambers of commerce, to protect the members of the community from the inroads of these varying influences which produce blight and deterioration in its widely varying aspects.

Coordination of effort, so far as the production and control of our milk supply is concerned, is a community imperative.

Speaking before the American Health Congress at Atlantic City in May, Dr. Crumbine emphasized a plan through which he would expect to gain the necessary control and guarantee of wholesome milk. From this paper the following paragraphs are abstracted:

Objective No. 1—To Stimulate the Production and Distribution of an Abundant, Clean and Safe Milk Supply

"That *Eternal Vigilance* is the watchword for clean and safe milk, as well as for that priceless treasure, Liberty, is tragically attested by the high diarrhea and enteritis rate among bottle-fed in-

THE MILK LABORATORY ON WHEELS USED IN THE MILK SURVEY

fants fed on contaminated raw milk, and by the many epidemics of communicable diseases in which milk has been proved to be the medium of infection.

"North, in his article on Milk and its Relation to Public Health, appearing in 'A Half Century of Public Health,' lists 580 milk-borne epidemics reported between 1857 and 1920. The characters of the epidemics were as follows:

Typhoid fever epidemics	375
Scarlet fever epidemics	128
Diphtheria epidemics	55
Septic sore throat epidemics	22

"He admits, as we all know, that this list is a partial one.

"A milk-borne diphtheria epidemic occurring in Austin, Texas, was reported in 1922; 71 cases of diphtheria occurred, 57 being among adults. The source of infection was a former milker who had a perforating ulcer of the septum of the nose, from which diphtheria bacilli were isolated. This milker infected a cow, from the udder of which diphtheria bacilli were recovered.

"About a year ago there occurred in Chester, Pa., 600 cases of streptococci infection, the source of infection being traced to a dairy in which a milker was suffering from sore throat.

"In the summer of 1924 there occurred a rather extensive epidemic of para-typhoid fever, the source of infection proving to be a certified milk.

"In order to obtain recent data on the extent to which milk is found to be the vector of infection in certain communicable diseases, questionnaires were sent out to all state, territorial, and provincial health officers, requesting data on the milk-borne epidemics which had occurred in their territory during the years 1915, 1924, and 1925. Answers were received from forty-two states and the District of Columbia, three territories of the United States, and three provinces of Canada.

"Forty-three milk-borne epidemics involving 1,373 cases were reported for 1924; 44 milk-borne epidemics involving 1,913 cases were reported for 1925. In both years, typhoid fever caused the largest number of reported epidemics, and in 1924 the largest number of cases of milk-borne diseases were cases of typhoid fever. In 1925, however, milk-borne septic sore throat had a higher incidence than typhoid fever. Two epidemics, the first involving 312 cases, the second, 600 cases, are responsible for most of the cases reported.....

"Nothing further need be added at this time to establish the fact that uncontrolled and unsupervised milk supplies are a potential source of danger in the dissemination of serious and oftentimes fatal diseases.

Objective No. 2—To Center the Responsibility on Dairymen, Milk Dealers, and State and Local Dairy and Health Officials

"The second objective in this clean and safe milk campaign which we are considering, was first launched in 1923.

"In October of that year the American Child Health Association offered to the state food and dairy and the state health officials of North Dakota the use and service of its field milk laboratory and a non-technical field agent of the Association, on condition that the state should furnish the technical and field inspection staff to do the actual field and technical work in such communities as the state authorities might mutually designate.

"These conditions being mutually acceptable, the united clean and safe milk campaign was formally launched October 1, in Fargo, and has continued in one state after another up to the present time, twelve states having been thus far surveyed, in the following order: North Dakota, South Dakota, Kentucky, Florida, Louisiana, Delaware, Michigan, Georgia, Oklahoma, Utah, Washington, and Oregon.

"Three types of examination were made of all milk supplies: first, a visible dirt test; second, a bacterial count, including in most instances B. Coli determination; third, chemical examination

for detection of adulteration, either by adding water or by skimming. The standard methods of the American Public Health Association were used by the bacteriologists in all the states surveyed.

"In eight of the twelve states surveyed, a representative of the American Child Health Association was loaned to the state officials to conduct a follow-up campaign to the milk survey. This representative has had a wide experience in dealing with the various social and civic groups, and is thoroughly familiar with the perplexing problems of milk production and distribution.

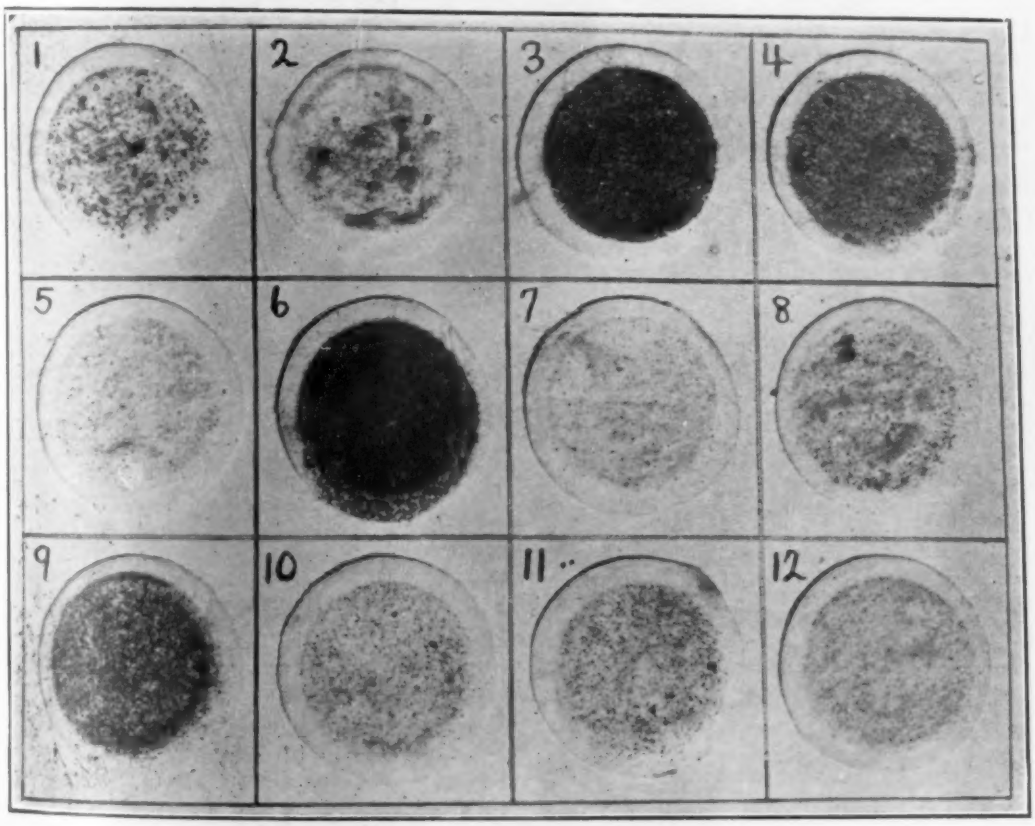
"Seven hundred and thirty-nine conferences were held in eight states, two hundred and eighty being group meetings, with a total attendance of over 40,000. Many thousand pieces of literature were distributed and many institutions and laboratories were visited. Many of these group meetings, conducted by the survey group and the field worker, were groups of dairymen who were sufficiently interested to attend the meeting and to ask to be shown the result of the examination of their own milk supply. In one state a dairymen's organization for the county was perfected, membership being conditioned upon the observance of the rules laid down by the state officials for the production and distribution of clean and safe milk.

"In all states, definite commitments were made either by the State Department of Health or by the State Dairy Commissioner, to carry on the work of the survey until the entire state was covered.

"In one state the entire state has been completely covered twice since the original survey. In two states field laboratory equipment was secured for continuing, without interruption, the work of the survey, in one instance the trunks holding the field laboratory equipment of the Association being sold to the state health officer in order that the work might go forward continuously.

"In a single parish in a southern state, dairymen purchased and installed eighteen steam sterilizers. In five states the laboratories of state normal schools or high schools were secured to act as milk laboratories for the respective local communities. In one city, where a hot political campaign was under way, the storm center of which was the Health Department, commitments were secured from both sides to inaugurate and continue satisfactory milk supervision and control.

"In almost every city visited having a population of 5,000 or over, definite commitments were secured for the passage of a proper milk control ordinance, an amendment of an inadequate ordinance, or the determination to enforce milk regulations that were not being properly enforced. In most of the communities visited by our follow-up worker, addresses were made to the noon luncheon clubs or chambers of commerce, and visits made to the public schools; all in the interest of clean and safe milk, and on nutritional value of increased consumption of safe milk. In several of the municipal water laboratories, commitments



DIRT LEFT ON COTTON PLUGS THROUGH WHICH A QUART OF MILK WAS STRAINED

A WINDOW IN A GROCERY STORE
Clean milk becomes an important business asset when properly advertised

were secured to use such laboratories for the regular analysis of milk.

"In three or four cities and counties, the survey has resulted in the serious consideration and establishment of full-time health units.

"In one city, where the milk inspection was under an independent political appointee, who was making regularly laboratory reports of milk examination—reports which in the main showed a very satisfactory condition of the marketed milk—the survey revealed a deplorably dirty milk with a high bacterial count. Later it was discovered that the laboratory equipment, which had been purchased for the milk examination and control, had never been unpacked from the original cases, and the supposed laboratory reports were indeed mere laboratory romances. Milk control in this city is now under the Department of Health.

"In another state, in a large dairy area where milk was being shipped a considerable distance to two important winter resorts, the milk that was all brought into a central pasteurizing plant was found to be, in the main, dirty and of a high bacterial count, and therefore potentially dangerous.

"In one state the County Commissioners appropriated $5,000 for inspection and control, and three cities passed up-to-date ordinances governing sale of milk. Marked improvement has already been noted.

"In another state a Central Committee with representatives from three cities met to discuss plans for joint dairy inspection. Among those present were Mayors of these cities, members of the Chambers of Commerce, County Health Officers, representatives of various organizations, and representatives from the State Dairy and Food Commission. The plan under discussion suggested, among other things, the appointment of a full-time dairy inspector for these three cities with a proposed yearly budget of from $3,100 to $3,500. (Total amount raised, $3,625.)

"As a whole, it can be said that improved methods and technique in the production and distribution of milk throughout the surveyed states have been greatly stimulated. It is confidently hoped that these improvements are of a permanent character. Certainly, the sense of responsibility of state and local officials has been reenforced and strengthened to the degree of counting tremendously in promoting the permanent safety and wholesomeness of the milk supply of their states.

Objective No. 3—To Promote Increased Consumption of Milk After Reasonable Assurance of Its Safety

"Milk, by reason of its butter-fat content, the biological value of its protein, and its essential salts and vitamins, possesses exceptional value as a food; it is desirable, therefore, that its use should be encouraged by every reasonable means, as a safeguard against nutritional defects which are so widely prevalent throughout this country. One of the chief obstacles to increased consumption of milk is its insanitary production, which is rendered evident to the consumer by visible dirt, sometimes in amount as to make it repulsive, and the early souring of the milk even when kept in the ordinary refrigerator or ice-box; these with the development of objectionable flavor or smell must always exercise a limiting influence on the consumption of milk. Not until clean and safe milk can be offered to the public can we expect a maximum consumption of this important food.

"These important considerations confronting us as public officials and health workers must find some practical and reasonable solution. It is submitted that the first step in that solution is to make every reasonable effort possible to render the milk safe, after which time we can, in all good conscience, work for the increased consumption of milk until it approaches, at least, the minimum requirements for our growing children.

"It is the writer's judgment that this first step will include, not only effective supervision over the sanitary production and distribution of milk, but must eventually—from the standpoint of assured safety—include the effective pasteurization of all milk sold for human consumption. It must be constantly kept in mind that pasteurization of milk is not intended, nor will it ever be, a substitute for complete sanitary control of its production."

EDITORIAL NOTE.—A considerable part of Dr. Crumbine's paper on "A Campaign for Clean and Safe Milk" has ben published in the August 15 issue of *The Nation's Health*. The complete paper is obtainable in mimeographed form from the American Child Health Association, 370 Seventh Ave., New York, and will also be included in the Proceedings of the 1926 Conference of State and Provincial Health Authorities of North America, scheduled for publication this fall.

Three important articles on milk control appear in *Public Health Reports* for July 30, 1926. These are entitled "Committee Report on Uniform Standard Milk Ordinance," "National Program for the Unification of Milk Control," and "Revised Public Health Service Standard Milk Ordinance."

HELP AVAILABLE

The benefits secured by the states and cities mentioned in this article are available for your state and city, if you have not yet taken advantage of them. An inquiry addressed to the American Child Health Association, 370 Seventh Avenue, New York, will bring you full information.

More Equitable Taxation by Scientific Assessment of Real Estate

By Samuel A. Carlson
Mayor, Jamestown, N. Y.

THE city of Jamestown, N. Y., has just gone through the experience of having two complete reassessments of its real estate, both of which revaluations having been efforts to secure greater equity in the distribution of the tax burden.

For two years past, Director of Assessments Henry T. Krieger, unaided, had studied various plans of scientific assessment and had applied as much of the plans as was possible without the employment of expert assistance. The publication of his revaluations naturally aroused protests from many taxpayers whose assessments had been increased. Assessor Krieger had made his revaluations without public discussion and comparison of views of citizens as to street or building valuations. Although regarding Mr. Krieger as a conscientious and highly capable official, the taxpayers were not prepared for so radical a departure from the old basis as resulted from the Assessor's arduous labors in personally revaluing something like 17,000 lots or parcels of land and the buildings thereon.

Chamber of Commerce Contributes $15,000

The objections to the assessments were so numerous and so vociferous that the Jamestown Chamber of Commerce undertook to solve the difficulty by contributing $15,000 to a special fund to be expended by the city for the employment of disinterested experts to assist the assessor in a revaluation of the city real estate. The Chamber of Commerce specified that the Somers System of Land Valuation should be employed, this system having been previously used by assessors aided by experts in nearly 100 cities, and by assessors without expert assistance in many other municipalities.

The status quo in the assessment of real estate is always difficult to overturn. The existing assessments are often the heritage of many years of compromise. The costs of new buildings and the selling prices of land are matters of daily comment in every community, and are known generally to assessors, but it is always difficult to translate the selling prices of land and buildings into fair assessments. The assessor who knows that a certain property sold for $100,000, and who is required under the law to value separately the land and the buildings thereon, hesitates to use the sales price as a basis for assessing even the property sold, because he is aware that the conditions of sale often reflect the necessity of the buyer or the seller, as the case may be, rather than fair or normal value. The law of the state of New York requires assessment for tax purposes at full cash or market value, but it does not instruct the assessor as to the proper methods for determining such value. Because of the lack of an adequate system for comparing values, it is difficult in actual practice to transmute the prices paid for real estate into fair tax assessment prices. In the last analysis, value is comparative. This is particularly true of land values where the effect of the community in creating and modifying values may be definitely seen, understood, and estimated.

The city authorities of Jamestown, in compliance with the suggestions of the Jamestown Chamber of Commerce, engaged the Manufacturers' Appraisal Company of Philadelphia to furnish expert assistance to the director of assessments for the reassessments. The work required four months' time, employing eight of the company's experts, besides about thirty non-expert building measurers and clerks who were employed locally. The work was accomplished altogether without reference to any previous valuation, on an independent plan. At the request of Walter W. Pollock, President of the Manufacturers' Appraisal Company, a committee was appointed of nine of the substantial business men of the city—real estate men, manufacturers, bankers, merchants, and others—who were requested to act in an advisory capacity in the determination of the unit-foot values throughout the city. This committee was jointly selected by the Mayor, the President of the City Council, and the Corporation Counsel. The men selected had intimate knowledge of the comparative and actual values of land in Jamestown. They spent several weeks in advising the Assessor, being guided as to their methods of expression of opinion by an expert of the Appraisal Company.

Selecting the "Best" Block

A map of the central business section of Jamestown was spread before the committee. This map showed block outlines only, and the

question first presented to the committee for solution was, which of the street frontages in the business center was the "best" block. There was practically unanimous opinion that the best or highest-value frontage was on Main Street, between Second and Third Streets. The general opinion was that the coming highest-value street is Third Street, and the corner of Main and Third was determined as the highest-value property in the city. Other streets, of course, rotated downward in value according to location, etc.

After making percentage comparisons between the best street and others in the neighborhood, the question of valuation in dollars was next considered.

Under the Somers System land is appraised by a method which is comparable to the valuation of other commodities. Cloth is bought and sold by the yard; wheat, by the bushel; butter, by the pound; and there are other standard units of quantity which are generally adopted and acceptable, to which community opinion is applied as to value, except in the appraisal of land. The customary unit of land value is the lot, or the front foot or square foot. Lots vary in size and shape and in relation to street accessibility. A front-foot value is subject to modification not only because of variations in depth, but because of possible alley, corner or other enhancing influence. Square-foot valuation is not uniform in its adaptation for general appraisal purposes, because any square-foot appraisal for a lot or a street represents merely an opinion of the average value of many square feet, and is therefore not specifically useful.

Factors Affecting Lot Values

The Somers unit-foot, when appraised, represents uniformity in quantity, because it represents opinion of the value which a single street reflects to the land fronting thereon, one foot front, 100 feet deep. Lots of 100 feet deep may not exist on a given block frontage, but whatever the depth of the lots, they may be transformed into actual lot frontage values by the Somers depth percentage. The valuations determined on the streets are street values, and not lot valuations. Lots which are exactly 100 feet deep and accessible from a single street only, have the same front-foot value as the unit-foot. The depth percentage will transform the unit-foot into front-foot valuation for lots of greater or less depth than 100 feet. For lots so located as to have accessibility or potential usefulness from two streets, values may be mathematically computed by taking into consideration the unit-foot values fixed for the two streets, the sizes and shapes of the lots, and their relations to the streets.

The street valuations may be judged, and judged comparatively. That is a matter of opinion, and by the Somers method the widest possible opinion is obtained and subjected to public discussion. In Jamestown the unit-foot valuation for each block was developed as a consensus of opinion of the members of the committee, and after public discussion was modified to represent the community opinion. This valuation was the basis for computation for the lots in each block, not only those having single-street accessibility, but for all lots. Lot values are, of course, enhanced more at street corners in high-value business districts than in semi-business, wholesale, or residential districts. The theory is that there is a calculable relationship to be ascertained by first determining the street values by opinion, and then computing lots according to the variations existing therein.

Maps Published in Newspapers

The Advisory Committee spent several weeks in its study of the comparative values of streets. Assessor Krieger had previously appraised unit-foot values upon streets, but he had not subjected the unit-foot valuations to public criticism.

The city was divided into five districts for valuation purposes, and the maps showing unit-foot valuations were published in the local newspapers, and were used as a basis for public criticism and discussion by the property owners of each district. There were, however, comparatively few changes in the original unit-foot valuations as determined by the Assessor and experts. Several public meetings were held at which all criticisms were answered and discussed. The Advisory Committee had not put excessive valuations on the street frontages, and it is believed that the land is thus appraised at a trifle below the maximum selling price, although near enough to full value to be considered substantially a full-value appraisal.

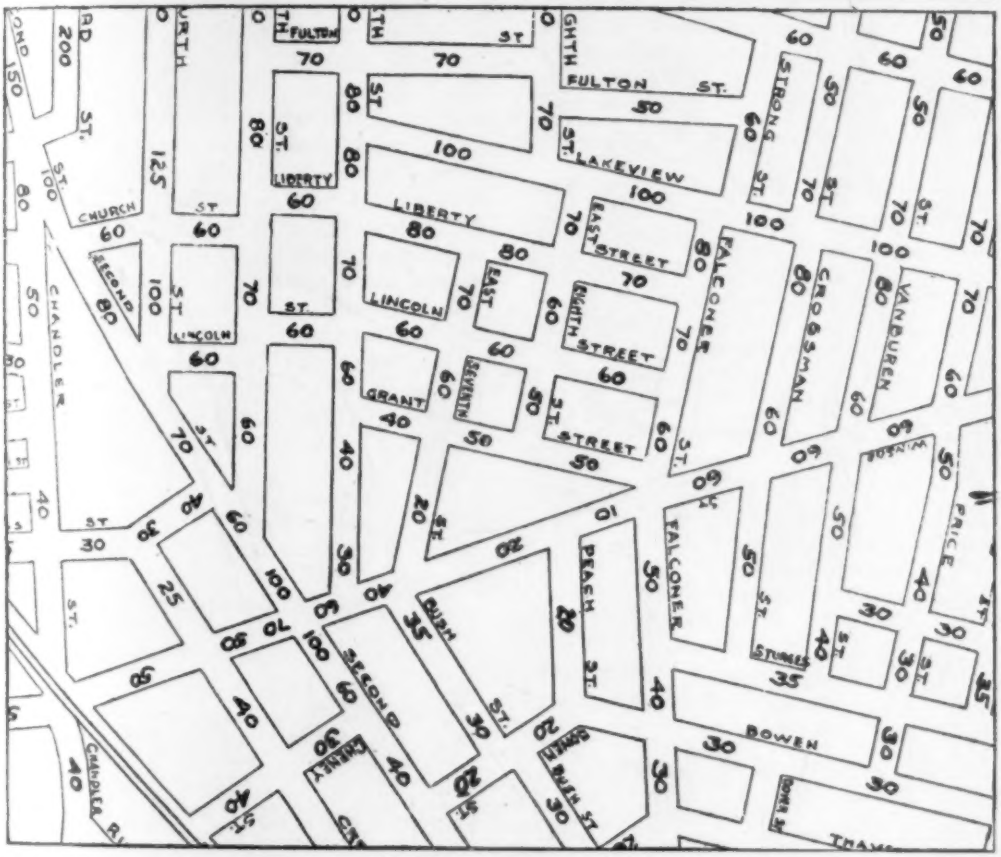
Following the final determination of unit-foot valuations, a computation was made, on a separate card, for every lot, showing the dimensions, the unit-foot value or values upon streets affecting the lot, with variations for depth, alley, corner, or other influences. This is a permanent record which shows the basis for each lot assessment.

Revaluation of Buildings

In the revaluation of buildings, a separate card was first written for each lot or parcel of land in the city, showing the dimensions, the owner, etc. These cards were grouped by blocks and were taken out by building measures

under the direction of an expert. Upon each card was checked the character of construction under suitable headings. The dimensions were measured, and from the total number of square feet of floor space thus ascertained, and from personal inspection, an expert building construction appraisor was enabled to determine the proper factor per square foot of floor space for cost of new reproduction. From the expert's inspection of each building he was also enabled to determine the proper percentage of accrued depreciation to deduct for considerations of age, mechanical deterioration, and obsolescence. There were many lots upon which the buildings numbered more than one. Each building was separately described upon an individual card, and the total of all such additional buildings, listed on cards of different tint from the main building card, was transferred to the main building card, thus making possible the valuation upon a single card of all buildings upon each lot or parcel.

TENTATIVE UNIT PRICES-- DISTRICT NO. 3



Each number on the above map is the tentative price in dollars of a unit-foot.

A unit-foot is a piece of land a foot wide and 100 feet deep from the street, fronting in that part of the block where its price is not influenced by cross street, alley, railroad or other factor

The effect of cross-streets, alleys and railroads upon any given area, is ascertained by the use of the Somers corner lot and overlap tables.

A lot that has a depth less than 100 feet partakes of a portion only of the unit-price and that portion is ascertained by the use of the Somers depth tables.

A lot that has a depth greater than 100 feet has a price in excess of the unit prices and that excess is ascertained by the use of the Somers depth tables.

A lot at or near a corner partakes of the effect of two streets and that effect is ascertained by use of the Somers corner tables.

A lot with an alley or useable railroad frontage has an added usefulness and what is added is ascertained by Somers valuation rules.

The Somers tables and computations are based, fundamentally, upon the formula ascertained by Mr. Somers after the examination of thousands of examples, that 72 1-2 per cent of the usefulness of a lot 100 feet deep and with but one street influence applies to the front half of the lot and the remaining 27 1-2 per cent applies to the rear half of the lot.

A public meeting has been called for next Tuesday evening, Aug. 11, at 7:30 p. m. in the auditorium, third floor, City hall, to consider the tentative prices of the central section, after which the tentative prices of all the remaining sections of the city will be considered.

ONE OF THE DISTRICT MAPS PUBLISHED IN THE NEWSPAPERS FOR PUBLIC CRITICISM

The valuation of lots, as finally computed, and the depreciated or sound values of buildings were transferred upon an abstract sheet for each block, and the values of lots and buildings thereon were totaled upon such sheets. The valuations were afterwards regrouped by streets, and were published in pamphlet form and distributed to property owners throughout the city, in order to furnish information for complaints.

Action by Board of Review and Correction

Considering the tremendous innovations which the installation of the Somers System brought about and the bitter attack made upon this plan in the mayoralty campaign by those who sought by misrepresentation to make political capital against the present Mayor, the number of complaints presented to the Board of Review and Correction was comparatively small. Of course it was to be expected that out of 17,000 parcels of property, a considerable number might have been erroneously valued, but the total number of complaints filed was only 449, of which 76 were reduced by the Board, the other 373 not being regarded by the Board as justifiable complaints.

There was no increase in assessments made by the Board on any property.

The amount of decreases in the assessment amounted to $442,750.

The total assessed valuation of land and buildings as finally determined was $59,012,750.

The percentage of individual taxpayers who made complaints was less than 3 per cent of all the taxpayers of the city.

The percentage of reduction to total assessments by the Board of Review and Correction was less than 1 per cent. All attempts by a few dissatisfied property owners to invalidate the roll by legal action have thus far proved fruitless.

Effect on Mayoralty Campaign

As a result of delay in revision of roll, the period assigned this year for the hearing of the complaints unfortunately coincided with the municipal campaign for election of Mayor and other city officials. Thus, the opponents to the present Mayor, who on this occasion was a candidate for his ninth term, made the most of the occasion by demagogic appeals and misleading statements to the effect that tax burdens would be increased, etc. The result of the election, however, was not only a vindication of the Mayor, in his re-election again by an overwhelming majority, but virtually an endorsement of the Somers System.

In Jamestown the assessment of property is made by a Director of Assessments who is appointed by the Mayor and confirmed by the City Council, and who becomes solely responsible for assessments. But all complaints which are not adjusted by the Director are referred automatically to a Board of Review and Correction, which holds public hearings regarding all such complaints. This Board is composed of the President of the City Council and two additional Councilmen, appointed by the President, and in addition two citizens, not connected with the city government, are appointed by the Mayor, making five members in all, a majority of whom are elective officials. This independent board to which appeals may be made satisfies those who might otherwise fear too much arbitrary power from a single-headed appointive assessor.

Results Summarized

In summarizing, let me say that in Jamestown, like most other cities, assessments had been made by the usual guesswork methods, with the result that revenue-earning properties had not contributed an equitable share of the general tax for public expenses. The Somers plan completely revised the assessment method which had been in vogue for years. Street values, with reference to traffic accessibility, desirability, etc., were determined in a scientific manner, and individual property was revalued on the basis of these street values, which were appraised by the Citizens' Committee. Buildings were appraised on the basis of square foot of floor space, according to prevailing reproductive cost, with usual allowance for depreciation, etc.

The city and school tax rate under the Somers assessment roll was reduced from $40 per $1,000 valuation, under the old assessment, to $20.88 under the new assessment, based on the 1925 budget. On a 60 per cent basis, the total valuations were increased from $31,000,000 to $59,000,000. (It is aimed to eventually bring all property up to full value.) Notwithstanding the propaganda against the new plan of assessment by those who have been under-assessed, less than 3 per cent of the 10,000 individual taxpayers made complaints, which means that 97 per cent of all taxpayers considered the Somers' assessment entirely satisfactory, and more equitable than any previous assessment.

The Krieger plan was in the main verified by the Somers experts and concurred in by the Advisory Committee. This had the psychological effect of strengthening public confidence in the entire procedure, which was worth to the city many times the cost of the employment of the Somers experts.

A Study of Certain Factors Affecting the Stability of Asphalt Paving Mixtures

By Prevost Hubbard and F. C. Field

Chemical Engineer and Chemist, respectively, The Asphalt Association

AT the 1925 annual meeting of the American Society for Testing Materials the authors presented a paper describing a laboratory test for determining the relative stability, or resistance to displacement, of paving mixtures of the sheet asphalt type. Briefly described, this test consists in forming a cylindrical briquette from the hot paving mixture, allowing it to cool and age for a short period, and then warming it to 140° F., placing it in a testing mold and measuring the maximum load required to force the mixture through a circular orifice of given diameter. Such load is recorded as the stability value of the mixture.

In the test devised by the authors, measurement is made of the initial resistance of the mixture to shear, or of its initial internal friction, and not of its mobility or plastic flow. Other things being equal, it is evident that this initial internal friction will depend to a great extent upon the closeness of packing of the mineral particles. In other words, degree of compression or density is a most important factor bearing upon the stability of any given mixture, and this was clearly indicated in a series of tests by the authors of briquettes of the same mixture formed under direct pressures of 1,000, 2,000 and 3,000 pounds per square inch, where it was found that, within this range, the stability value of the mixture varied directly with the forming load. Of course, such relation would not continue to hold indefinitely with increase in pressure, as a point would finally be reached where no greater density could be secured without crushing the individual grains of the mineral aggregate. Such a point may be termed maximum practical density.

Direct compression under 3,000 pounds per square inch had originally been selected as a basis for comparing stability values, but it was later noted that under this load many mixtures did not develop the density that they might reasonably be expected to possess, and this fact has led to a modification of the original method of preparing specimens. This modified method, which is briefly described in the following paragraph, has, in general, raised the stability value of all mixtures tested; but where checks have been run, the trend of new results is practically the same as for the old results and the differences are for the most part purely relative.

The following directions cover the new method of preparing test specimens in batches of three, each batch weighing approximately 350 grams:

"Weigh out the dried sand and filler to 0.1-gram. Heat this aggregate in the tarred mixing dish to 350° F., place on balance and weigh in hot asphalt at 250° F. to 0.1-gram. Thoroughly mix the contents of the dish for five minutes with a 1-inch putty knife, then place approximately 100 grams in each of three forming molds, numbered 1, 2, and 3, preheated to 250° F. Place the molds with base plates on a hot plate and bring the contents of No. 1 mold to 275° F. as determined by a thermometer which is used for stirring the mixtures. Remove mold No. 1 from hot plate and tamp contents for ½-minute with a ¾-inch diameter round iron rod 8 inches long. Then insert the plunger and place the mold in the empty water bath on the base of compression machine. Apply pressure to the top of plunger until a load of 3,000 pounds per square inch is reached. Fill the bath with cold water to a depth of 3 inches and allow the briquette to cool under pressure for 5 minutes. Then release pressure, remove the mold from the bath and force out the briquette. While the first briquette is under pressure, bring the contents of No. 2 mold to 275° F. Tamp, compress, and cool the mixture as in the case of No. 1. Repeat the operation with No. 3 mold. Keep the hot plate so regulated that until the mixtures are to be brought to the temperature for tamping they are maintained at about 170° to 180° F."

The compressed briquettes should measure approximately 1 inch in height. After being removed from the mold they are allowed to age in air over night and are then placed in a hot-water bath accurately maintained at the temperature of test (usually 140° F.) for not less than one hour before testing.

The new method of forming the specimen has improved the accuracy of the test, but occasional erratic results on briquettes of the same density have led the authors to believe that lack of uniform density throughout the individual test specimen may sometimes occur and that the method may eventually be further improved so as to insure maximum practical density throughout the entire briquette.

Increased Filler Increases Stability

In the paper last year the authors showed by diagrams that the addition of increasing

amounts of mineral filler to a given sand in general increased the stability of certain asphalt paving mixtures and that different fillers developed different stability values in the mix when present in the same percentage by weight. Thus, a mixture containing 10 per cent of hydrated lime showed a stability value about equal to one containing 20 per cent of limestone dust and about one and one-half times as great as a mixture containing 10 per cent of limestone dust.

In a later paper (Researches on Asphalt Paving Mixtures Proc. A. S. T. M., 1925), the authors showed that when the percentage of asphalt in the mix is kept constant and mineral filler is added to a given sand in increasing amounts, a point may be reached where further addition of filler begins to lower the stability. From a series of mixtures containing varying percentages of the same constituents, it was further shown, within certain limits, that among compressed mixtures containing the same percentage of voids, that mixture which showed the lowest percentage of asphalt developed the greatest stability. Typical curves were also shown illustrating the following: With a given mineral aggregate maximum stability is secured in mixtures carrying a rather limited range of percentage of asphalt. Increase in stability is to some extent controlled by increase in hardness of asphalt.

So many factors bearing directly upon the stability of asphalt paving mixtures had been developed, that the authors realized that a large field must be thoroughly investigated before it would be possible to obtain a correct perspective of the whole and ascertain the true interrelationship of all of the factors. It was possible to start almost anywhere in mapping out this field, and as the beginning of a systematic study it was decided to concentrate upon the effect upon stablility of variations in characteristics and percentage of the asphalt cement. The results presented in this paper deal primarily with this phase of the investigation, although it will be seen that most of the other factors already mentioned must be considered to some extent at the same time.

All of the mixtures hereafter described contained the same sand and limestone filler, possessing characteristics as shown in Table I. The sand represents a product widely used in sheet asphalt construction in New York City and vicinity, while the limestone dust, although containing somewhat less material passing the 200-mesh sieve than desirable, is widely used in the same locality and was obtained from the plant of a large paving contractor:

TABLE I—PHYSICAL CHARACTERISTICS SAND AND FILLER

Determination	Crane Sand (3) %	Limestone Filler (2) %
Sieves—		
10-20	2.5	.....
20-30	7.4	.....
30-40	11.5	.....
40-50	20.2	.2
50-80	36.2	.5
80-100	12.0	1.9
100-200	9.4	25.5
200-250	.8	5.3
250-300	.....	1.6
300-350	.....	9.4
Pass 350	.....	55.6
Total	100.0	100.0
Specific Gravity	2.64	2.69
Per cent voids	38.8	29.0

The asphalts used in these tests were all produced from crude Mexican petroleum and possessed the physical characteristics shown in Table II. Samples Nos. 3, 4, and 5, were regular steam-refined paving grades. Sample No. 7 was an asphalt cement produced by fluxing No. 5 with a heavy Mexican flux. Samples Nos. 1 and 2 were regular commercial grades of blown asphalt which were included in the tests for the purpose of ascertaining if low ductility of the bitumen had any direct influence upon the stability of paving mixtures in which they were incorporated:

TABLE II—PHYSICAL CHARACTERISTICS OF ASPHALT

Sample No.	Materials	Penetration 77°F.	Specific Gravity	Melting Point	Ductility 32°F.	Ductility 77°F.	Ductility 115°F
1	Brick Filler	28	1.034	165°F.	1cm.	9.3cm.	20cm.
2	Waterproofing Asphalt	35	1.04	152°F.	4 "	33.5 "	107 "
3	Paving Asphalt 31-40 Pen	37	1.044	135°F.	1.5 "	103 "	130 "
4	Paving Asphalt 41-50 Pen	48	1.041	133°F.	1.75 "	101 "	150+ "
5	Paving Asphalt 61-70 Pen	66	1.034	125°F.	4.5 "	106 "	150+ "
7	Paving Asphalt Fluxed	106	1.035	113°F.	9.0 "	80 "	110 "

Relation Between Stability and Per Cent Asphalt

In studying the effect of these asphalts upon the stability of paving mixtures it was decided to use three mineral aggregates composed of sand and 10, 20, and 30 per cent of limestone dust respectively. Previous work had shown that stability was to a considerable extent dependent upon the percentage of asphalt in the mixture, so in order to select satisfactory mixtures for further comparison, a series of tests was first run with mixtures composed of the three mineral aggregates and varying percentages of No. 4 asphalt. The results obtained are illustrated by the three curves in Figure 1:

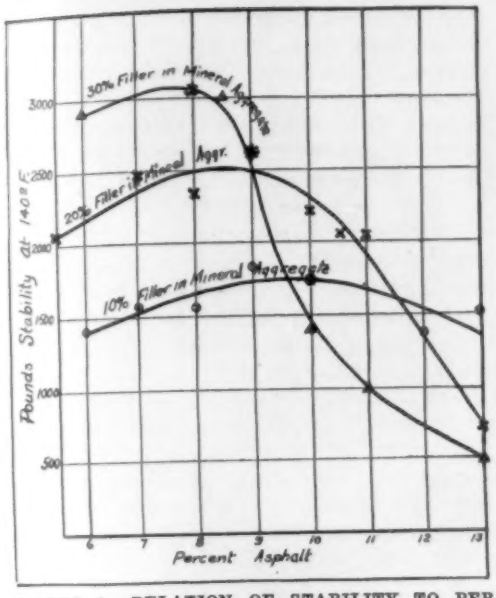


FIGURE 1.—RELATION OF STABILITY TO PERCENTAGE OF ASPHALT

The relation between stability and percentage of asphalt for these three aggregates is exceedingly interesting and significant. In the first place, it will be noted that in each case stability increases to a maximum with increase in asphalt from 6 per cent to a percentage which differs from the other two mixtures and then falls off as more asphalt is used. The stability represented at the crest of these curves is highest for the high filler mix and lowest for the low filler mix, but it is apparent that sensitiveness to slight changes in percentage of asphalt increases with increase in filler. In other words, after maximum stability has been secured, the high filler mixtures fall off much more rapidly with further increase in asphalt than do those containing less filler. The probable reasons for this will be discussed later as further data are presented. For the present it may be noted that as the amount of filler was increased from 10 to 30 per cent of the mineral aggregate, maximum stability was obtained by decreasing the percentage of asphalt in the mixture from 10 to 8 per cent. For this reason the mixtures shown in Table III were selected for further study:

TABLE III—MIXTURES TESTED

Determination Mesh	Mix (1) %	Mix (2) %	Mix (3) %
10-40	17.0	15.0	14.0
40-80	46.0	41.0	37.0
80-200	20.0	21.0	21.0
Pass 200	7.0	14.0	20.0
Asphalt	10.0	9.0	8.0
Total	100.0	100.0	100.0

Other Investigations

At this point a slight digression may be helpful in analyzing the stability results so far presented and those which follow. A number of investigators have rather recently come to the conclusion that the percentage of voids in the mineral aggregate has a very direct bearing upon the amount of asphalt which can be successfully used in a given paving mixture. Various tests have been devised for determining voids in sheet asphalt aggregates, perhaps the most popular being methods in which the dry mineral aggregate is fed to refusal into a cone or cylinder of known capacity, the container being tapped or rapped upon a table to assist close packing. Voids in the packed aggregate are then calculated from the weight of the known volume, taking into account the specific gravity of the solid aggregate. By standardizing all details of procedure, reasonably satisfactory check results may be obtained, but the authors have felt that any method of packing a dry aggregate containing a high percentage of filler is likely to result in segregation to such an extent as to produce misleading results.

As a means of obtaining some measure of voids in mineral aggregates as used in the stability test, a new method aimed to eliminate segregation as far as possible was therefore devised. Preliminary tests were first run on dry sand containing no filler and on dry limestone dust, after which varying percentages of kerosene were mixed with each until a range in proportion of kerosene was established which would give the same calculated voids as found in the dry aggregates. The following is a brief description of the method which was thus developed:

Place 100 grams weighed to within 0.01-gram of dry mineral aggregate in a porcelain saucer, weighing the sand and mineral filler separately in proper proportions where a combination of the two is to be tested. Add kerosene to the extent of 5 per cent of the weight of sand and 10 per cent of the weight of filler, and mix thoroughly. Then transfer the entire contents of the saucer to a cylindrical iron mold having an accurately determined diameter of approximately 5.08 cm. (2 in.). The forming mold employed in the stability test may be used for this purpose and should rest on a flat metal plate. Insert a close-fitting plunger in the mold and subject the mixture to a load of 3,000 pounds per square inch for one minute. Release the load and measure the height of the compressed mixture in the mold to 0.01-cm. This may be done by subtracting the height of the plunger in the empty mold from its height when resting on the compressed mixture. Without reference to the kerosene present, calculate voids in the mineral aggregate from the follow-

ing formulas in which V = volume of compressed mixture in cc.; d = density of the compressed mineral aggregate; D = theoretical maximum density of the total mineral aggregate considered as a voidless solid; G and G′ = the specific gravities of the sand and mineral filler respectively, which must be predetermined by any of the well-known methods; and W and W′ = the percentage weights of sand and mineral filler respectively which were present in the dry aggregate.

$$(1)\quad d = \frac{100}{V}$$

$$(2)\quad D = \frac{100}{\frac{W}{G} - \frac{W'}{G'}}$$

$$(3)\quad \%\ \text{Voids} = \frac{100\,(D - d)}{D}$$

Results obtained by this method on various combinations of the sand and limestone dust previously described are shown by the upper curve in Figure 2, which is seen to be quite regular and shows a minimum percentage of voids in the aggregate containing 50 per cent each of sand and dust.

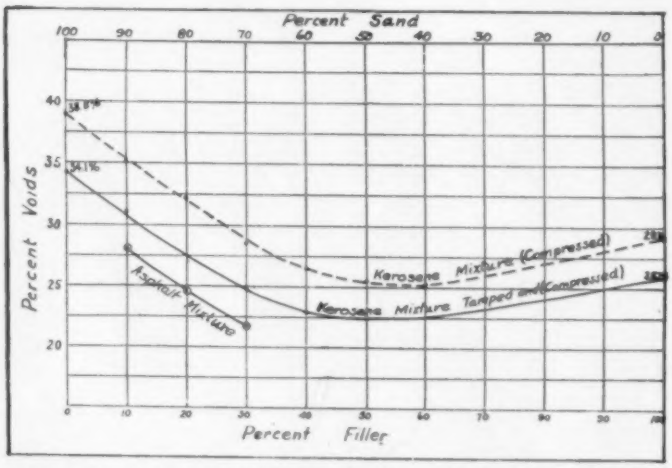


FIGURE 2.—EFFECT OF FILLER ON THE PERCENTAGE OF VOIDS IN MINERAL AGGREGATE

After it had been decided to tamp the asphalt mixtures for stability tests, the same method of tamping was adopted for the kerosene mixtures used in void determinations, with results shown by the second full curve, which is seen to be almost parallel to the first curve but showing from 3 to 5 per cent lower voids for individual combinations. Relatively, these two curves are the same, with corresponding high and low points, so that either might be used as a general guide in selecting a practical combination of sand and dust which would approach the minimum percentage of voids as closely as possible.

It should be realized, however, that in any mineral aggregate, no matter how thoroughly compressed, the individual particles are not in absolute contact even at points, but are separated by films. In the case of dry aggregates, air films, and in liquid mixtures, liquid films, exist between the particles. While the authors felt that the kerosene method of determining voids represented approximately the same degree of close packing without segregation as any dry method, they felt that none of the methods might correctly show the degree of close packing of the mineral particles in an asphalt paving mixture, as the films of asphalt might be greater or less than the films of air or kerosene. To obtain some information on this matter, they therefore adopted the following method of calculating voids in the mineral aggregate in asphalt mixtures, irrespective of whether these voids were completely or only partly filled with asphalt.

Method of Calculating Voids in Mineral Aggregate

The specific gravity of the compressed asphalt briquette was first determined. From this determined weight of a unit volume, the weight of asphalt present was subtracted to obtain the weight or specific gravity of the same volume of mineral aggregate, and the percentage voids in the mineral aggregate were then calculated by means of formulas (2) and (3). Results so obtained for the three asphalt mixtures that had been selected for further investigation are shown by the short curve in Fig. 2, where it is seen that the presence of asphalt in the amounts used further reduced the voids in the mineral aggregate. In other words, the mineral aggregate was more closely packed and the asphalt films separating the individual grains were thinner than either the films of air or of kerosene. This is probably due to the relatively high viscosity and cementitiousness of the asphalt, but is an important factor to be considered if the percentage of voids in the mineral aggregate is to determine the maximum allowable amount of asphalt to be used in a paving mixture, which assumption has been made by a number of paving technologists.

Following this work, some interesting studies of the relation of stability to voids were made

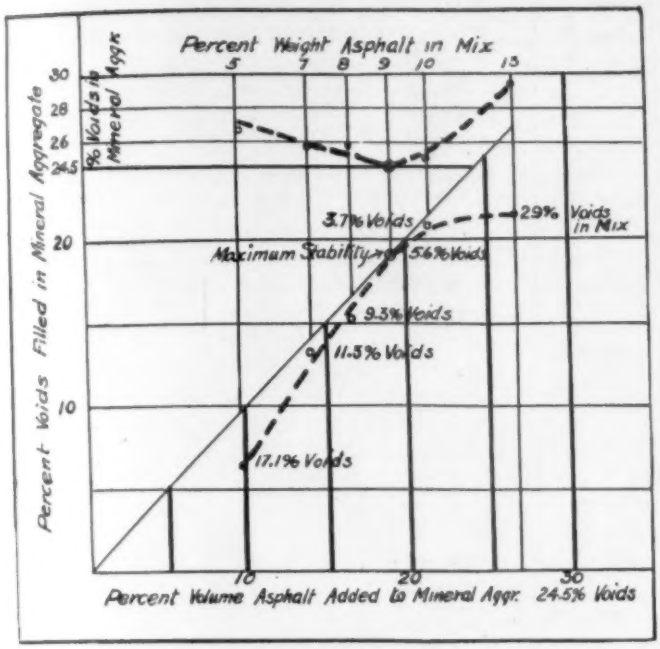


FIGURE 3.—RELATION OF PERCENTAGE OF ASPHALT TO VOIDS IN MINERAL AGGREGATE AND TOTAL MIX

in connection with the tests illustrated in Fig. 1. For each compressed mixture the voids in the mixture itself were determined, and the voids in the mineral aggregate, excluding the asphalt, were calculated to ascertain its closeness of packing. In each series it was found that maximum stability was developed where the mineral aggregate was most closely packed, but that such mixtures did not show the lowest percentage of voids in the series. These relations are illustrated in Fig. 3 for the 20 per cent filler series and are typical of those developed by the other two series.

If 24.5 per cent voids in the asphalt-coated mineral aggregate, the lowest percentage obtained, is considered to represent maximum practical density, it is seen from the upper curve in Fig. 3 that as the percentage of asphalt is increased from 5 per cent by weight, closeness of packing is gradually increased to a maximum at 9 per cent, after which it rapidly decreases with further addition of asphalt. Reference to the lower curve for which the asphalt has been calculated on a volume basis shows that further addition of asphalt decreases the percentage of voids in the total mixture but not in proportion to the volume increase in asphalt. It is believed that too little asphalt tends to prevent the closest possible packing of the mineral aggregate because of lack of mobility of the mixture during compression, and that too much asphalt tends toward the same result by creating a pasty mixture which is apt to trap air. Thus, when more than 24.5 per cent by volume of the asphalt was used, or an amount which should have reduced the voids in the mixture to zero, nearly 3 per cent of voids was actually found.

The establishment of an apparently logical reason for the relatively high stabilities of mixtures Nos. 1, 2, and 3 justifies their selection for further comparative study. Fig. 4 illustrates the effect upon their stability of variations in penetrations of asphalt cement.

Here it is seen that there is a very similar and definite increase in stability with decrease in penetration (increase in hardness) of the steam-refined or fluxed asphalts of high ductility. Projections of these curves into the penetration range covered by the blown or oxidized asphalts of low ductility, as in the case of mix-

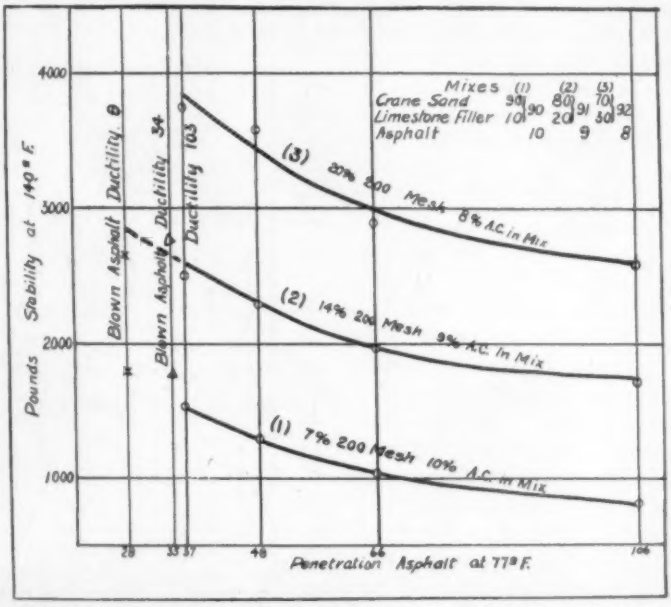


FIGURE 4.—RELATION OF STABILITY TO HARDNESS OF ASPHALT

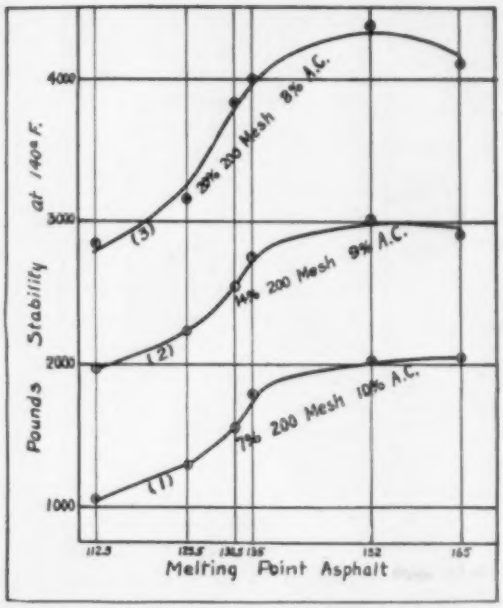


FIGURE 5.—RELATION OF STABILITY TO THE MELTING POINT OF ASPHALT

ture 2, indicates that the stability values obtained for the latter are only what might reasonably be expected from their lower penetration or greater hardness. In other words, no direct relation between stability and ductility can be established.

Fig. 5 shows that a fairly consistent relation between stability and melting point of the asphalt may be established, but that it is not as regular or definite as the relation between stability and penetration. In general it is seen that stability increases most rapidly with increase in melting point up to the approximate temperature at which the test is made, after which further increase in melting point produces relatively less increase in stability. It should, of course, be realized that the so-called melting point is a misnomer, as asphalts have no true melting point. The test is therefore only an approximation of a temperature at which the asphalt reaches a certain rather indefinite degree of fluidity.

For any given penetration of asphalt, the direct relation between stability and percentage of filler is more clearly shown in Fig. 6 than in the preceding figures. Here it is at once apparent that stability is more influenced by the percentage of filler than by even wide variation in characteristics of the asphalt cement. For instance, the stability of mixture 3 with the very soft asphalt of 106 penetration is higher than that for mixture 2 with a hard asphalt of 37 penetration. The possible significance of such relations will appear later.

Increase in Filler Does Not Necessarily Increase Stability

That mere increase in filler will not necessarily increase stability unless the percentage of asphalt is adjusted accordingly, is very clearly shown in Fig. 7, where the stability values given in Fig. 1 for the 8, 10, and 13 per cent asphalt mixtures are plotted against the percentage of filler in the mineral aggregate. In this figure it will be noted that the stability values of the 10 per cent filler mixtures are quite close together, irrespective of the variation in asphalt between 8 and 13 per cent. In the 8 per cent asphalt series stability increases consistently with increase in filler up to 30 per cent. In the 10 per cent asphalt series stability increases with increase in filler to 20 per cent and then falls off at 30 per cent filler, while in the 13 per cent asphalt series stability is consistently reduced with addition of filler, which is exactly the reverse of the 8 per cent asphalt series. The probable reason for such variation in trend of results is now quite readily explainable from the previous discussion of voids or closeness of packing of the mineral aggregate.

Effect of Temperatures Above 140 Degrees F. on Stability

Up to this point all of the stability tests which have been considered were made at a

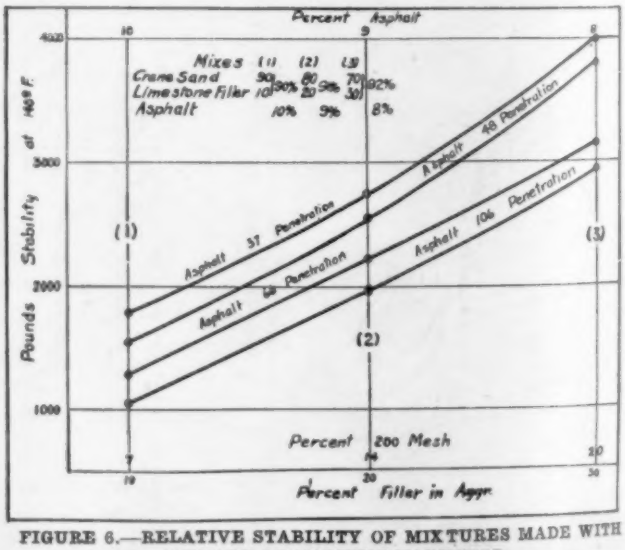


FIGURE 6.—RELATIVE STABILITY OF MIXTURES MADE WITH ASPHALT OF VARYING HARDNESS

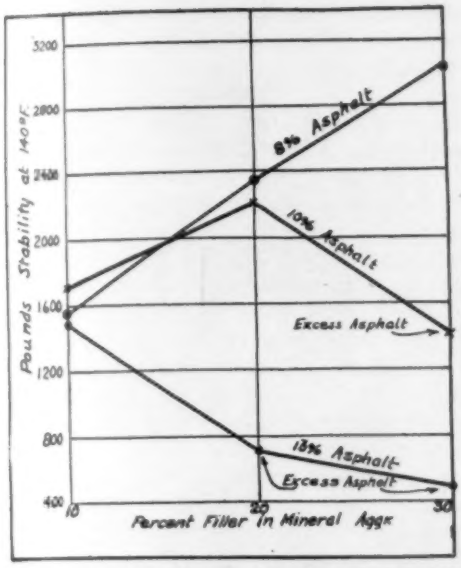


FIGURE 7.—EFFECT ON STABILITY OF THE RELATION OF PERCENTAGE OF FILLER TO THE PERCENTAGE OF ASPHALT

temperature of 140°F. It has been quite generally assumed that this temperature is about the maximum which the asphalt pavement reaches under ordinary conditions, but records of pavement temperature as high as 140°F. or higher have been obtained by the Federal Bureau of Public Roads as far north as Washington, D. C., and it is quite probable that higher maximums occur for short periods in many parts of the United States. It was therefore considered advisable to obtain some idea of the effect of variation in temperature upon the stability of various mixtures. Accordingly, a series of tests upon mixtures 1, 2, and 3 with the different asphalts was run at temperatures of 100°, 140°, 150°, and 160° F. The relative effect of variation in temperature upon all three mixtures was found to be very similar and is illustrated by Fig. 8 covering mixture 3.

Here each curve represents a series of tests at a single temperature and shows the stability at such temperature as affected by the penetration of the asphalt cement used in the mixture. It will be noted that the same general type of curve occurs at all four temperatures and that stability is invariably increased with decrease in penetration of the asphalt, although as the temperature becomes less there is a tendency for the curves to become steeper. This of course means that, at comparatively low temperatures, when the mineral aggregate remains the same, hardening the asphalt tends to increase stability more markedly than at high temperatures. With regard to the effect of mineral filler, it may be stated that curves at the same temperature for all three mixtures showed increasing stability values as the percentage of filler became greater.

Effect of Temperature on Stability of Individual Mixtures

The direct effect of temperature upon the stability of individual mixtures is of very great interest from a practical standpoint, and each mixture with its various asphalts was so plotted. Fig. 9 shows the relations developed by the extremes and average of the steam-refined asphalt mixtures, and may be considered as typical.

It is seen in each case that, within the temperature range at which tests were run, practically straight-line relations exist, and that for a given mix with a given degree of compression, stability is apparently a direct function of temperature of the mix, and increases as the temperature decreases. Some variations from this rule were found in the case of certain mixtures, possibly due to experimental errors, but so many of the mixtures developed this approximately straight-line relation that the existence

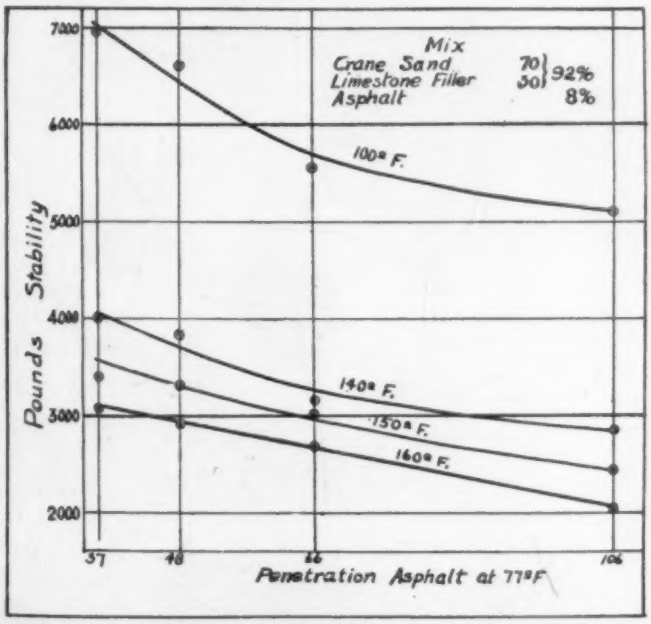


FIGURE 8.—RELATION OF STABILITY TO TEMPERATURE AND HARDNESS OF ASPHALT IN HIGH FILLER MIXES

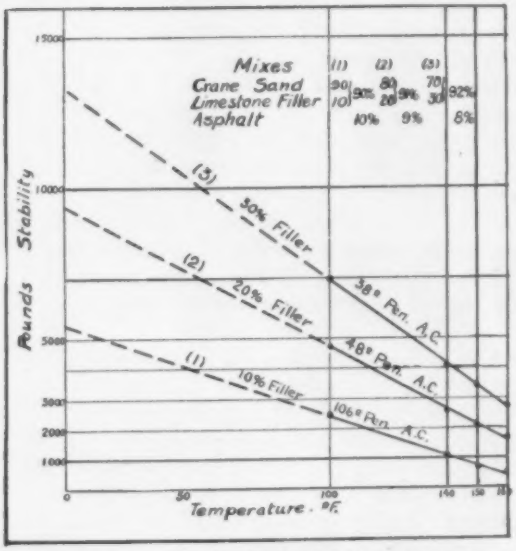


FIGURE 9.—RELATION OF STABILITY TO TEMPERATURE

of a law is fairly well indicated. If further investigations confirm this relation, it will make it possible to determine the stability of a given mixture at any temperature by making two determinations at different temperatures and projecting a straight line in both directions through the values obtained.

Means of Controlling Tendency of Mixture to Crack

The dotted lines in Fig. 9 are projections of the stability values of the three mixtures to 0° F., at which temperature very wide differences are shown. It is quite well understood in the paving industry that some mixtures which have proved very stable become so hard and brittle as to crack badly at low temperatures. It is very necessary, therefore, that in any attempt to increase stability this factor should be kept in mind. If the straight-line temperature relation is confirmed, a practical means of controlling tendency to crack is at once indicated as a use of the stability test, and the authors hope shortly to concentrate on this phase of their investigation. The field is promising, as it has already been pointed out that the same degree of stability at a relatively high temperature may be obtained with a soft asphalt and a high percentage of filler as with a harder asphalt and a lower percentage of filler.

The temperature slopes of such mixtures are, however, different, so that considerable differences in stability at low temperatures are indicated, and it would seem that between two mixtures with the same stability at 140° F. the one showing a slope with the lesser pitch would be the more resistant to cracking.

Summary

In recapitulation, particular attention is directed to the following deductions which may be drawn from this investigation of factors affecting the stability of asphalt paving mixtures:

1. Closeness of packing or reduction of voids by compression of the mineral aggregate exerts a much greater stabilizing effect than the mere reduction of voids in the entire mixture. Specific gravity or density of the mixture itself is therefore not always a direct indication of either degree of compression or stability.

2. Asphalt films surrounding the particles of compressed mineral aggregates may be thinner than the air or liquid films which exist in the usual methods of determining voids. Therefore, any attempt to proportion asphalt in a mixture with the idea of completely filling the voids as determined in the mineral aggregate may result in the use of too much asphalt with a marked reduction in stability.

3. The greatest stability for a given mineral aggregate has not been obtained with that proportion of asphalt which would produce the lowest percentage of voids in the compressed mixture. The fact that further reduction of voids in the mineral aggregate is likely to occur under traffic after a pavement has been laid, due both to additional compression and internal wear, indicates that from the standpoint of stability mixtures should be designed so as not to be completely voidless even after thorough compression during construction. Cases have been noted where pavements have been quite stable for a number of years following construction and have afterwards suddenly become unstable with no sudden change in traffic. It is believed that in such cases, while the proportion of asphalt was originally satisfactory for the degree of compaction of the mineral aggregate, a further reduction in its voids under traffic made the quantity of asphalt excessive.

4. In order to secure maximum stability in paving practice, the percentage of asphalt must be controlled within much narrower limits for high-filler low-void aggregates than it is held for relatively low-filler high-void aggregates.

5. Of the physical characteristics of asphalt, which are usually determined, penetration at 77° F. appears to exert the most direct and definite effect upon stability of the mixture

at all temperatures, and a general increase in stability, produced with a given mineral aggregate, accompanies decrease in penetration of the asphalt.

6. Next to closeness of packing of the mineral aggregate, percentage of filler appears to be the greatest stabilizing factor in paving mixtures, and, provided the proper proportion of asphalt is used, increased stability is invariably produced by increase in filler, at least to the extent that such addition decreases voids in the mineral aggregate. If, however, the proper proportion of asphalt is not used, an increase in filler may result in decrease in stability.

7. The stability of a given compressed mixture appears to be directly proportional to its temperature, but the proportion varies for different mixtures, so that of two mixtures which show the same stability at 140° F., one may be much harder and more likely to crack at low temperatures than the other.

ACKNOWLEDGMENT.—From a paper presented before the 1926 annual meeting of the American Society for Testing Materials.

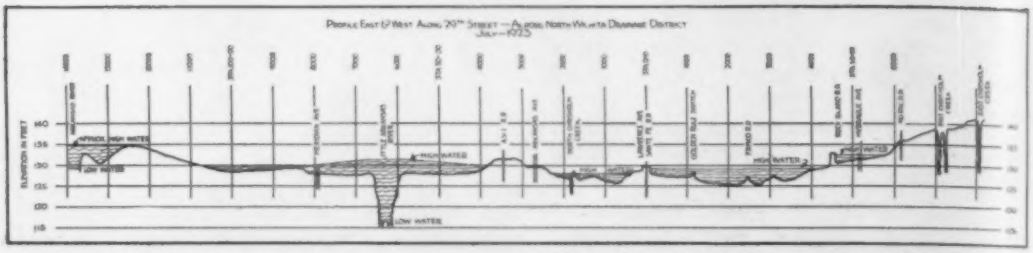
Solving the Flood Problem at Wichita, Kansas

By P. L. Brockway
City Engineer, Wichita, Kansas

LIKE so many of the cities in the Mississippi valley, Wichita is located at the junction of two rivers. The Little Arkansas River flows into the Arkansas River within the corporate limits. The Arkansas River rises in the mountains of Colorado, coming out into the great Rocky Mountain slope at Pueblo, Colo. It runs in an easterly direction across Colorado and about half-way across Kansas, swinging to the south into Oklahoma near the middle of the southern boundary of Kansas, and finally merging with the Canadian River near the middle of the east boundary of Oklahoma.

The grade of the river is relatively steep across Colorado, flattening rather abruptly in the western edge of Kansas. It brings down immense quantities of quartz and granite sand and gravel out of the mountains in flood stage, dropping the larger particles as the velocity decreases in the flatter slopes. In periods of extreme low flow the wind blows the finer particles of sand out into dunes, which support some vegetation. Willows and cottonwoods grow up in the sand-bars and islets.

A TYPICAL MEANDERING NARROW CHANNEL AT WICHITA BEFORE FLOOD-CONTROL IMPROVEMENT
The dead stump and trees show the severe cutting of the banks at the flood stages of the river



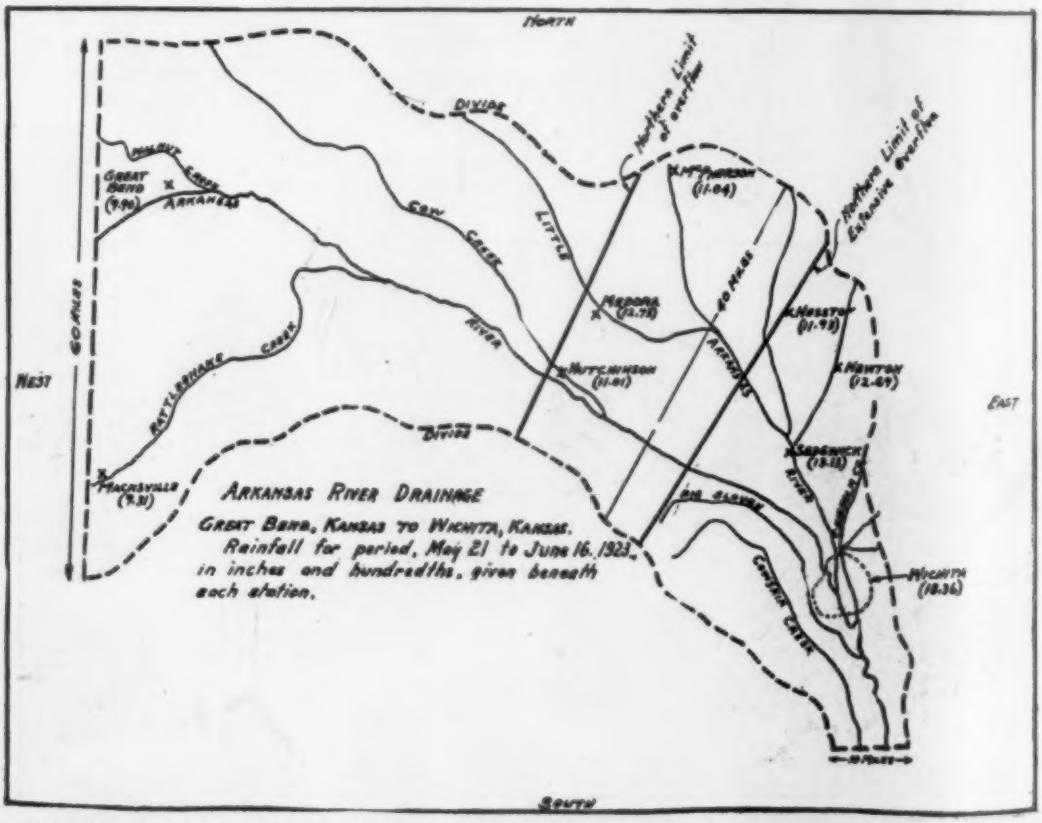
PROFILE TAKEN EAST AND WEST ALONG 29TH STREET, WICHITA, IN JULY, 1923, SHOWING THE REMARKABLE SITUATION OF THE ARKANSAS RIVER FLOWING THROUGH ITS STREAM BED ABOVE THE LEVEL OF THE SURROUNDING COUNTRY

This also shows the flooded condition of portions of the lowlands

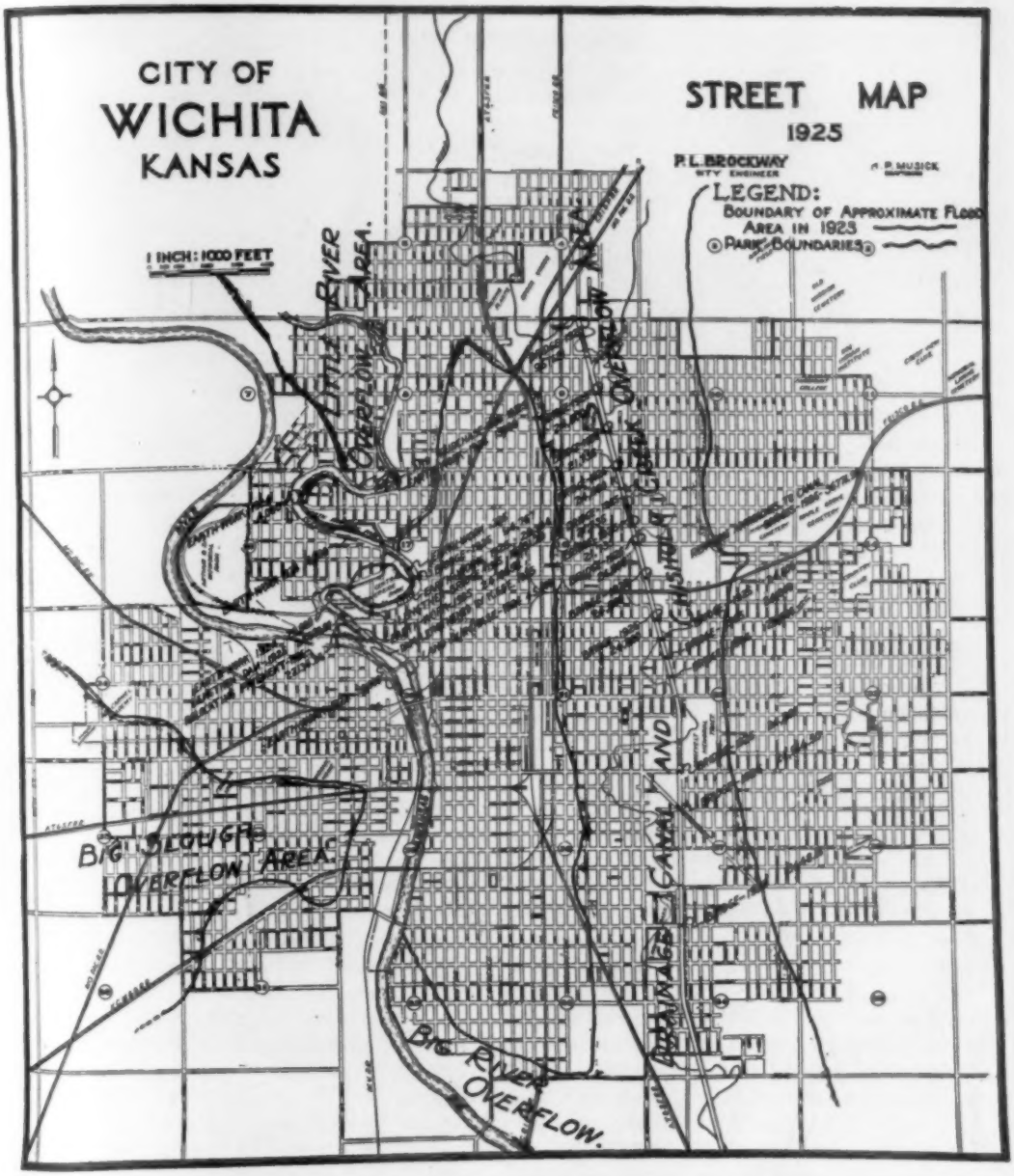
This vegetation catches more drift and silt in flood stage, so that the final result is the building up of river-bed, banks, dunes, islands, and bars all together. This has been proceeding so long that the river flows on a pronounced ridge and has shifted laterally over considerable territory, forming vast gravel and sand-beds. These form underground storage for water in great quantities, which is being used for irrigation by pumping with low-head, large-capacity centrifugal pumps.

The banks in many places are so poorly defined that they are difficult to follow, and in the western part of the state the river overflows with a rise of 4 to 7 feet. The direction of flow is away from the river to lower areas which act as detention reservoirs. The tributaries to the river run nearly parallel to it for long distances at flatter grades, so that they return overflow water to the river very slowly. This is strikingly shown in the drainage area map.

The net result is that heavy floods in the river in Colorado are of only passing interest



DRAINAGE AREA MAP FROM GREAT BEND TO WICHITA, PREPARED BY CLARK JACOBY, CONSULTING ENGINEER



by the time they reach Wichita. For example, on June 9, 1923, a crest of 7,400 second-feet passed the Colorado-Kansas line, which dropped to 2,400 second-feet at Great Bend. On June 18, the same year, a flood of 14,300 second-feet at the state line was reduced to 8,700 second-feet by the time it reached Great Bend. In August, 1923, a crest of 18,000 second-feet at the Kansas line dropped to 5,000 second-feet when it had reached Wichita. The 1921 flood which caused such a disastrous loss of life and property at Pueblo produced a maximum flow of 8,000 second-feet in Wichita.

Because of these reasons, it has been found unnecessary to give any serious consideration to rainfall or extreme flood conditions west of Great Bend, and the map of the drainage area has been prepared as shown, entirely disregarding the river west of that point. At its worst, it is not necessary to provide for a greater flood than 8,000 second-feet in Wichita, because the river-bed above the city simply cannot hold more than that quantity. It runs over into the Big Slough and around the city at the location shown on the map that is reproduced above.

Streams Causing Floods

The Little Arkansas River, known locally as the Little River, drains about 1,200 square miles, rising in a territory of sand dunes which support many springs that continue to flow in the driest periods. Its drainage area is rolling prairie very largely under cultivation. It has delivered about 12,000 second-feet of water into Wichita territory on several occasions.

Finally, the insignificant-appearing stream called Chisholm Creek in the edge of the map drains about 65 square miles, largely uncultivated steep slopes on the ridge to the east and northeast of the city. This territory has discharged 8,000 second-feet into the city and the valley adjacent, or as much as the Arkansas River itself.

The drainage area map also shows that the basin is shaped somewhat like a funnel, all the drainage converging into the narrow valley in which the city is located.

A cross-section of the valley at Twenty-ninth Street, just north of the city limits, is fairly typical, showing the Arkansas River high above the rest of the valley, the Little River lower and overflowing in turn to the east, and the Chisholm Creek bed lowest of all, and all overflowing laterally in flood stage. The map of the city in detail shows the course of the various streams within the corporate limits.

Notable Floods

The whole valley was flooded in 1877, presumably by simultaneous flood stages in all three streams. The valley was only sparsely settled, and no great general damage was done.

In 1904, the two rivers were in flood stage together, overflowing into the center of the city in such quantities that the principal business streets could only be navigated in boats, some streets being covered deep enough to "swim a horse." Following this, a considerable portion of the lower end of the Little River was flanked with earth dykes, and Chisholm Creek was straightened by the construction of the canal shown on the map and known as the Wichita Drainage Canal. Neither improvement was calculated from any run-off data or discharge requirements, being apparently a compromise solution of many schemes proposed in response to the popular demand that something be done. For example, later measurements showed that the canal had a capacity of about 2,500 second-feet when running bank-full, but that the dozen or more bridges across it of the Luten arch type reduced the capacity to about 1,300 second-feet at the same stage.

Drainage Receives Serious Consideration

No serious flooding occurred again until 1916, when the two rivers were again in simultaneous flood stage, the Little River doing considerable damage in the north end of the city and the industrial area adjacent. This gave rise to a popular demand that something be done to protect the industrial area from the constant flood hazard, which tended to retard its normal development. This finally led to the establishment of a drainage district lying partly within and partly without the city and the employment of Clark Jacoby as consulting engineer in the spring of 1923. Mr. Jacoby had scarcely time to organize his forces when a very serious flood occurred which gave him a wonderful opportunity to obtain direct run-off data.

The drainage area map taken from his report has indicated on it the total rainfall during a 25-day period from May 21 to June 16, 1923. The normal annual rainfall is about 31 inches. Following a general total rainfall of about 4 to 8 inches in the first nineteen days of the whole period, 3 to 7 inches of rain fell on June 9 over practically all of the Little River and Chisholm Creek area. Measurements and calculations of extreme flow indicated a maximum run-off of about 0.2 second-feet per acre from the smaller area, amounting to about 8,200 second-feet. Fortunately, the maximum discharge from the various branches of the creek was not simultaneous, so that the combined crest discharge was estimated to be about 6,500 second-feet. Referring again to the 1,300 second-feet capacity of the canal bridges in the city, it is easily understood that the water was a mile wide the morning of the 10th and that the residents of that part of the city east of the canal were cut off from the rest of the city.

By the next day, the Little River was overflowing into the valley north of the city, flooding the area shown on the map for several days. The levees built in 1905 along the lower portion of the river were held by liberal use of sand-bags and brush revetments, so that the business district was not flooded. The overflow into the area north of the city reduced the maximum discharge to about 10,000 second-feet. A further rise of 6 inches, or less than 1,000 second-feet additional, would have flooded the entire business section in the heart of the city by flowing over the levees. The electric power-plant stood in the direct path of the greatest danger.

The Big Arkansas River also rose to flood stage above the junction with the Little River, overflowing into the Big Slough. The com-

TYPICAL PARK FRONTAGE ALONG THE RIVER AT WICHITA, KANSAS
This lake will be four miles long, two hundred feet wide and from three to ten feet deep when improvement is completed

bined flow produced a crest of about 17,000 or 18,000 second-feet in the Big River through the south half of the city. It did not overflow except in the extreme south end of the city, because commercial sand pumping, continuing for years in the center of the city, had lowered the bed of the river as much as 7 feet. This is one instance, at least, of flood prevention resulting as a pure by-product of industrial operations.

Finally, on June 15, a local 4-inch rain occurred in the Big Slough area which caused it to overflow into the southwest part of the city into territory which had not been flooded since 1877. No great disaster occurred, because the valley is so wide and flat that most of the area was covered less than a foot deep and very little of it was covered more than 4 feet. Velocities were low, so that very little scouring occurred. Only one life was lost, and that came as the result of an infected cut sustained by a barefoot policeman assisting marooned families to move their belongings to higher ground. As to property damage, thousands of families sustained small losses from flooded basements, ruined floors, damaged furniture, drowned chickens, and ruined gardens, lawns, and shrubs. Industrial losses, of course, were larger.

S. P. Peterson, in charge of the United States Weather Bureau, estimated damage as follows:

Crop damage in the valley north of the city	$942,000
Bridges and highways	95,000
Railroads	335,000
Industries and dwellings in and adjacent to Wichita	840,000
Total	$2,212,000

Mr. Jacoby made a very careful survey of damage and estimated the damage to public and private property within the city as being $920,000, and to industrial property, including railroads, adjacent to the city, $443,000, making a total of $1,363,000 in the Wichita area.

From all these direct data, investigations were made as to the possibility or probability of greater run-off. Rainfall records are not very complete in the territory, few of them extending over more than twenty years. The maximum recorded precipitation is 11 inches in 24 hours. Such excessive rainfalls extend over a relatively small area and are of very rare occurrence. An 8-inch rainfall in the city of Wichita itself in September, 1911, extended such a short distance that the streams scarcely left their banks, and ran down again in a few hours. Inasmuch as no floods in forty years had exceeded those of the observed conditions in 1923, plans were prepared for the improvement of channels to a sufficient capacity to discharge the observed run-offs with a safe margin.

Definite Flood-Control Plans

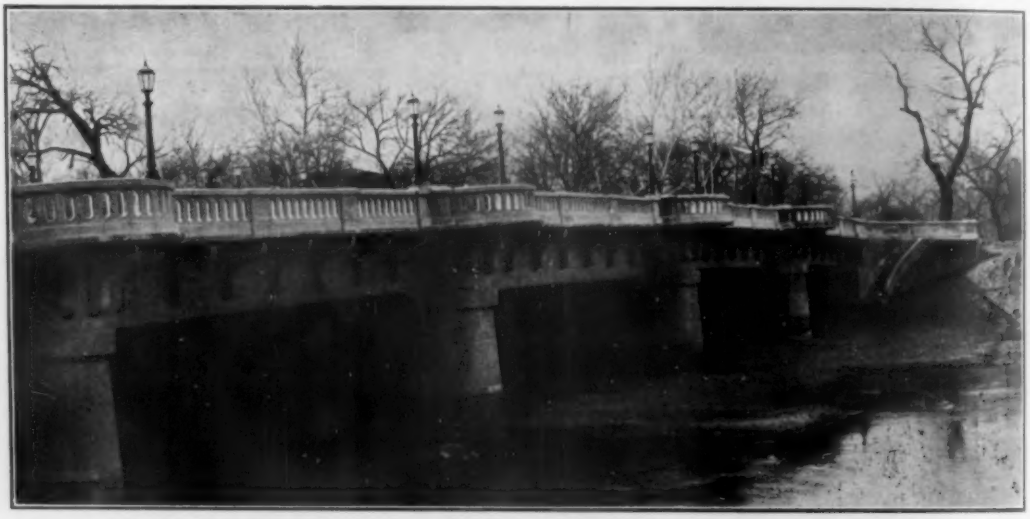
Plans prepared for the North End Drainage District include the cleaning of the channel of the Little River and construction of levees where necessary to prevent overflow, and the construction of an artificial channel near the eastern limits of the valley of sufficient size to intercept all the tributaries of Chisholm Creek and prevent their overflow, carrying this channel into the upper end of the old Wichita Drainage Canal. These plans were adopted after detailed investigations were made of all suggested possibilities. Costs were approximated at $300,000 to $400,000. Incomplete legislation was corrected in 1925, the District was reincorporated, and final details are now being prepared. Subject to legal delays, this work should be ready for actual physical construction very soon.

The problem presented to the city of Wichita consisted therefore in improving the channel

of the Drainage Canal to a capacity of 8,000 second-feet, the Little River to 12,500 second-feet and the Big River to about 20,000 second-feet. As an emergency measure, $55,000 was provided in the tax levy for 1924, which was spent in clearing the canal prism of trees and undergrowth, strengthening the weakest spots in the old levees along the Little River, and widening the Big River immediately below the mouth of the Little River where it had been narrowed by artificial encroachments. About $45,000 additional was spent in purchasing river-front land. Extensive surveys of all channels were made in 1924 and detail plans perfected.

The Little River flows through the city in a series of long loops. It has a slope of about 2.5 feet per mile. The city owns property developed for park purposes for many years within these loops. On the opposite side the territory is almost fully developed with good residences and with well-defined and improved streets along the river bank. The city maintains a lake up around these loops, with a dam near the mouth of the river, and a power company maintains another dam right at the mouth for industrial purposes. Obviously, any channel cutting across the loops would destroy the beauty of the parks, besides passing through such expensive territory as to make the cost prohibitive. The erection of high levees is also undesirable for three reasons: danger of burrowing animals undermining it and starting serious leaks, the only available soil being almost pure sand; unsightly appearance in a good residence district; and the impossibility of draining surface water into the river at flood stage or preventing it from backing out of storm sewers without expensive and troublesome gates in the outlets.

Therefore, it was decided to widen the channel to a minimum width of 250 feet bank to bank at a height of 12 feet above low water, and build levees up to a minimum of 3-foot freeboard above this flood plane. This is being done without interfering with the grades on river-bank streets. Levees in the parks are given very long back slopes, not less than 5 to 1, for the sake of appearance. The river slopes are calculated 2 to 1, but in certain locations they are made much flatter, setting the levee top back from the river and making attractive glades on gentle slopes to the edge of the lake in the parks.



A NEW BRIDGE AT THE PRINCIPAL ENTRANCE TO THE CHAIN OF RIVER PARKS IN WICHITA
The dark portions of the piers are below normal lake level

The lower portion of the river was scarcely 100 feet wide when the present river improvement program was commenced. Approximately 110,000 yards of earth was moved in this work in the winter and spring of 1925. The dam at the mouth of the river was increased from 130 to 270 feet in length in the summer of 1925 by the controlling company. The dam owned by the city was increased from 160 to 250 feet. The city dam is normal to the channel and the power dam at an angle of about 70 degrees. A wooden bridge just below the dam was lengthened 110 feet, and the whole river widened about 100 feet for the thousand feet nearest its outlet.

The next bridge upstream, a reinforced concrete deck girder, was increased to 245 feet between abutments by the construction of an

additional span. The next bridge was an old wrought-iron structure consisting of two through Pratt trusses with fish-belly suspended floor beams, built in the late 80's. It was replaced with a reinforced concrete deck girder structure 105 feet longer than the old bridge. This bridge is the main entrance to the park system and was made with a 40-foot roadway, 12-foot walks, and special observation bays over each pier, and with stairs leading down to a boat landing on the abutment.

As 1925 drew to a close, the city completed the purchase of all of the river-bed and banks from 13th Street north to the city limits, a distance of about a mile and a quarter. The minimum width of the strip acquired is 350 feet, providing room for the 250-foot channel and 50-foot levees. The total award of the appraisers was $72,000. Some appeals were taken, so that it may finally cost as much as $100,000.

The work in 1926 includes the clearing of the channel throughout this length. The appropriation was $25,000, and, if this proves insufficient, additional funds will be provided. The picture of the river channel, taken at the beginning of the operations, gives a pretty fair idea of the task involved. Three other sections of the levee are being moved back at an estimated cost of $20,000 to $25,000 apiece. Contract prices range from 29.5 to 45 cents per yard, on specifications providing that three-fourths of the earth will be moved 300 feet or less and that the remainder will be moved 600 to 1,000 feet. This will make the 1926 expenditure on the Little River about $100,000. All of this work must be done with the water let out of the lake each winter, and it is hoped that this winter will be the last for some time in which the river will look so disreputable.

ACKNOWLEDGMENT.—Abstract of a paper presented before the Fourteenth Annual Meeting of the National Drainage Congress.

The Street-Repair Problem in the Small Town

By Harry Wohlwend

City Engineer, New Brighton, Pa.

ONE of the most difficult problems for the city engineer of the small town to-day is the construction and maintenance of streets and alleys. There is a very large mileage of streets in comparison to the valuation of taxable property; also, the small town is compelled to build and maintain thoroughfares to accommodate foreign traffic without any aid from the county, state, or federal government. Thus, every dollar collected for street purposes must be stretched to the limit.

New Brighton, Pa., has a population of 11,000 and a taxable valuation of slightly less than $6,500,000. The budget for new work and maintaining 22 miles of streets and alleys is $32,000.

Five years ago, when the era of trucks and automobile transportation virtually began, mile after mile of bad roads began to come to our attention. Then the study of methods to improve the streets of New Brighton through maintenance was started. Most of the streets which at that time were in need of considerable maintenance were built prior to the advent of heavy motor traffic. Taxpayers were continually complaining that the roads were all right when they were built, but that the heavy traffic had destroyed the surface. After this complaint had been made enough times, we realized that some inexpensive means must be found to resurface, first, our main street, which

INTERSECTION OF TWO OF THE PRINCIPAL STREETS IN NEW BRIGHTON, PA., SHOWING EXCELLENT CONDITION OF RESURFACED STREET

THE CITY FORCE WHICH HANDLES PATCHING, SHOWING THE LIGHT TOOLS AND ERIE ROAD ROLLER

was laid in 1892 with brick on a gravel base and with sand filler, and then other streets, in order to keep them in a serviceable condition.

Because of the limited yardage of resurfacing to be done we could not afford to set up an asphalt plant for the hot-mix job. Several cars of a Kentucky rock asphalt known as Kyrock were ordered, and in July, 1924, we began to resurface one side of our main street. This was a strip 11.5 feet wide adjacent to the street-car rails and 4,750 feet long. This was followed with the resurfacing of the other side. Since this surface has been laid, no limit has been placed on the weight of loads and the paving has been subject to horse-drawn steel-tired circus trucks weighing up to 16 tons each, without showing any indentations which might have been expected.

SECTION OF SURFACING JUST LAID, READY FOR ROLLER

Method of Resurfacing

Our method of resurfacing is very simple and is done with our own street force. First, the street is swept clean of all dirt, and then it is painted with a good cut-back asphalt thinned with a good grade of gasoline. Care is taken not to apply this paint too heavily, as no paint is needed between the bricks on the sand filler, and it is not desirable to allow pools to form in the depressions, as the excess paint would soften the Kyrock. Immediately after painting we are ready to lay the resurfacing material. This is unloaded direct from the railroad car into small trucks and dumped a few feet ahead of the work. The workmen fork or shovel it into place and then rake it smooth with a light-weight asphalt rake.

THE EQUIPMENT USED IN PATCHING

The men seem to prefer using a stone fork having eight tines 1½ inches apart. If the weather is fair, the surface is not rolled until near the end of the day's work and then is rolled only once with a 5-ton tandem roller. Immediately after rolling the traffic is turned on; parking, however, is not permitted for a few days and horse traffic is kept off a day of two.

The best results are obtained if all depressions are filled with Kyrock at least two months ahead of the final resurfacing, as this allows traffic to press down the material in the deep depressions, making a smoother resurfacing job possible with greater ease.

We have found that this

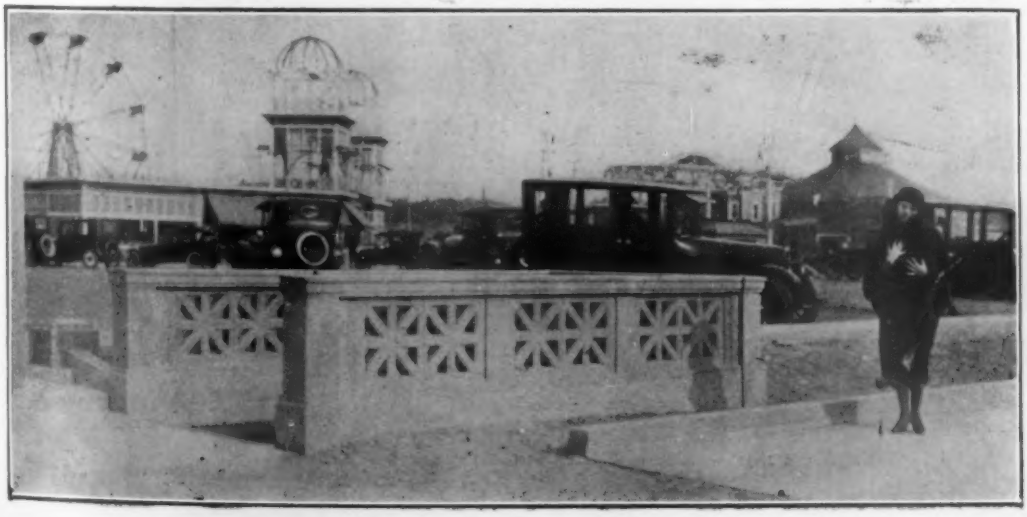
method of resurfacing requires no expensive equipment and that the surface is skid-proof, as it contains nothing but silica sand and natural asphalt. Because of the fine aggregate, it is possible to feather-edge the surface where necessary, and if the surface is painted properly the material will stick closely. Repairs can easily be made with this rock asphalt. The water company, gas company, and plumbers are forever tearing up the streets, but this damage can be repaired quickly and at very small cost, as all that is needed is a little asphalt paint and a few shovelfuls of Kyrock; or, if there is a depression in the street surfacing caused by the settling of the base, it can simply be painted and enough of the rock asphalt put on to bring it a little above level. Then the surface is tamped and the job is done. One man with a wheelbarrow patched a bad depression 1½ inches deep in the center and covered an area of 4 square yards in 1¾ hours. This was the actual time for the complete job, which included loading the wheelbarrow, getting the paint, wheeling the material four blocks, doing the work, and returning to the building.

PATCHWORK ON BRICK ROAD, SHOWING HOW ROUGH ROAD WAS SMOOTHED UP

We have had no trouble with bleeding even on hillside streets. The average cost for the completed job of resurfacing with Kyrock 1½ inches thick, filling the depressions with the same material and allowing 10 per cent for the use of tools and equipment, was $1.29 per yard. This year, with improved methods and better routing, we expect to lower this figure. The street railway company is now using this material.

Artistic Entrance to Public Comfort Station

THE accompanying illustration shows the entrance to a public comfort station at the Ocean Beach just south of the Cliff House that was built by the city of San Francisco for the accommodation of the many people who visit the ocean beach daily. In order that the promenade might be unobstructed and also to avoid the necessity upon the part of the public of crossing the heavy-traveled Great Highway, it was decided to place this comfort station beneath the area occupied by the sidewalk of the Beach Esplanade. The station measures over-all 92½ feet and 10 feet interior height. At the top of each of the concrete stairways leading to the station are ornamental concrete walls, and between these is a concrete cupola for ventilating the station.



Cartoons and Posters Aid Civic Progress

To an Increasing Degree Daily and Weekly Newspapers, Chamber of Commerce Publications, and National and Local Organizations Are Recognizing the Value of the Cartoon and the Poster as Aids in Influencing Public Opinion for Civic Progress

Kirby in *The World*, New York

CITY PLANNING INDICTS THE INADEQUATELY REGULATED SKYSCRAPER

HAVE A HEART

AN ANTI-LITTER CARTOON FROM "BROOKLYN," THE WEEKLY PUBLICATION OF THE BROOKLYN, (N. Y.) CHAMBER OF COMMERCE

Rubbish—Get It Out of the Cellar

PREVENT FIRES

The Fire Alarm Box—Learn Where It Is

HELP GIVE THE ALARM QUICKLY

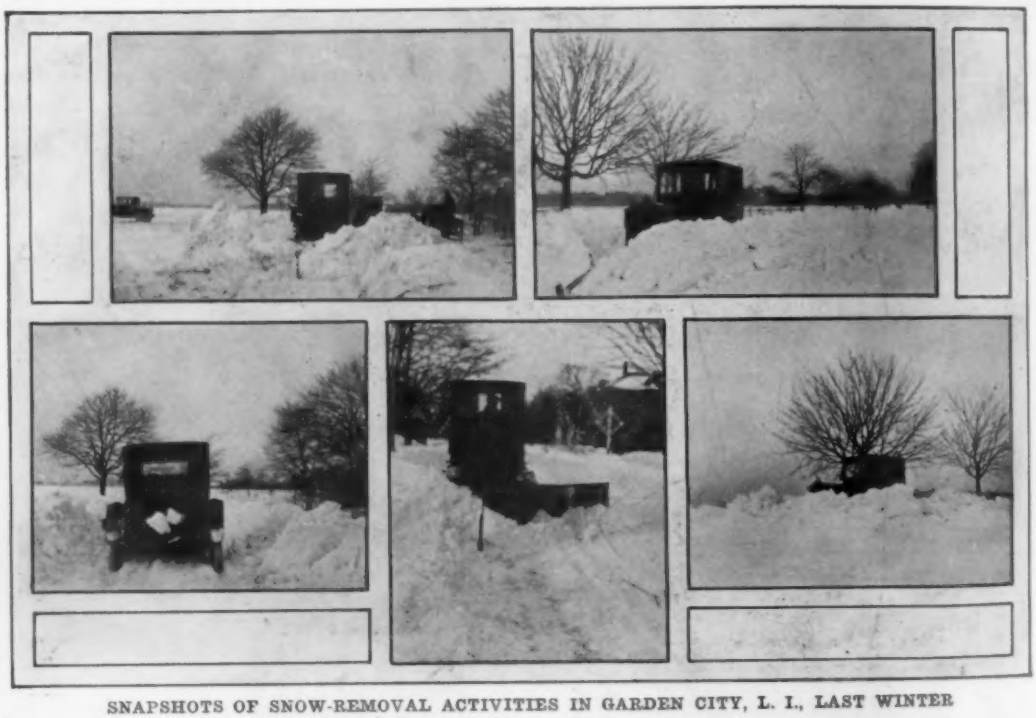
TWO OF A SERIES OF POSTERS PUBLISHED IN THE INTEREST OF FIRE PREVENTION AND PROTECTION, BY THE NATIONAL FIRE PROTECTION ASSOCIATION

Snow Removal in Garden City, Long Island

By C. R. McKay

Superintendent of Public Works, Garden City, Long Island, N. Y.

UNTIL a Model-K Cletrac tractor was purchased, Garden City used wooden V-shape plows with from four to six horses for opening the streets after each storm. This method proved to be very expensive, so the tractor and steel plows were procured. The new equipment has been very satisfactory as it saves time and is economical. This Department has approximately 55 miles of streets to be kept open, and during the severe storms of 1925-26 all of the streets were open to traffic the second day after each storm.



SNAPSHOTS OF SNOW-REMOVAL ACTIVITIES IN GARDEN CITY, L. I., LAST WINTER

We have two Cletracs for street work, and two plows. Each tractor has a driver and a helper who average five miles of streets plowed per hour. The tractor operator receives 77 cents per hour and the helper 50 cents per hour. The actual cost per mile, not including labor, gas, and oil, is 35 cents. The steel V-shape plow mounted on the front of the tractor plows a path 10 feet wide. The tractors are equipped with cork treads and enclosed cabs so that the driver keeps going in any weather and all night when necessary.

At present we are using some wooden V-shape plows and steel V-shape plows for the sidewalks. It has been found that the steel plows work much more satisfactorily than the wooden ones. All of the sidewalk work is done by one man with one or two horses.

"BEFORE AND AFTER" VIEWS IN AN INSPIRING REPORT

Probably the finest collection of "before and after" views of park and parkway improvements ever included in a single publication are contained in the Final Report of the Bronx Parkway Commission, which is mentioned briefly on page 439 of the September issue. City or county officials wishing to show their citizens what can be done with adequate funds intelligently spent will find this a very helpful document.

Water-Softening Plant at McKees Rocks, Pa.

By H. C. Kneeland
Chemist, Ohio Valley Water Company

THE Ohio Valley Water Company, supplying boroughs on both sides of the river below Pittsburgh, has recently completed and put into operation the largest Zeolite water-softening plant in the world and the first, so far as is known, to be used in America to supply an entire community with softened water. Zeolite softening has never been used on such a large scale before, because of the supposedly prohibitive cost, but in this instance comparison with the costs of other methods, the peculiar nature of the problem, and the limited space available, led to the selection of this method as being the most practical.

Character of Water-Supply

Somewhat extensive geological studies have established the fact that the Ohio and Allegheny River valleys are filled throughout their lengths with valley terrain composed of sand and gravel of Wisconsin glacial age; that these deposits tie in with the ground morain about Chautauqua Lake; and that they are filled with a good grade of water obtainable almost anywhere that wells are sunk. A silt layer on top of the gravel effectively seals out the surface river water, which is acid and grossly polluted with sewage and trade wastes. The Ohio Valley Water Company supply is taken from a group of about 50 wells, and the permanence of the supply is assured because of the abundance of water and the fact that, should harm befall the present walls, others of the Layne-Bowler type could be located on any of the several available sites. This water from the gravel has initial purity, and, whatever its faults, will always be better than the surface water or any water obtained by attempted purification of the river water.

EXTERIOR OF THE McKEES ROCKS WATER-SOFTENING PLANT

The analysis of the gravel water is quite constant the year round, averaging about 200 parts per million hardness, of which 55 per cent is calcium sulphate or permanent hardness. Magnesium does not exceed 4 parts per million, chlorides run about 12 parts per million, and dissolved oxygen and iron are very low. The really objectionable elements, aside from the hardness, are manganese 2.5 parts per million and the presence of crenothrix.

Troubles

Water of 12 grains hardness will always cause complaints, but in our case the complaints were aggravated by yellow manganese stains on table linens and other white fabrics. Another form of manganese trouble was the formation of deposites of the black oxide of manganese on the walls of the pipe lines. Tests made in the various parts of the distribution system disclosed that from 50 to 80 per cent of the original manganese content was deposited. These deposits were laced or held together by living strands of crenothrix and presented a serious menace to the ultimate safety of the line. Any form of treatment had thus to embrace the elimination of both manganese and crenothrix, as well as the production of soft water.

Preliminary Studies

The preliminary studies ran through a period of three years, the first of which was devoted to the chemical and geological experiments which established the character and source of the water-supply and the factors influencing them. A small Zeolite softening plant was then installed for use with the boilers and for purposes of study to determine its value under local conditions. It paid for itself in less than 10 months.

During the concluding year of the study, Robert Spurr Weston, of Boston, Mass., was called in as consultant and directed considerable experimental work on various types of demanganizers and softeners, and reviewed 404 days of operation on the small Zeolite plant, An additional experimental Zeolite plant was

installed and studied for loss of head, de-manganization, and crenothrix removal.

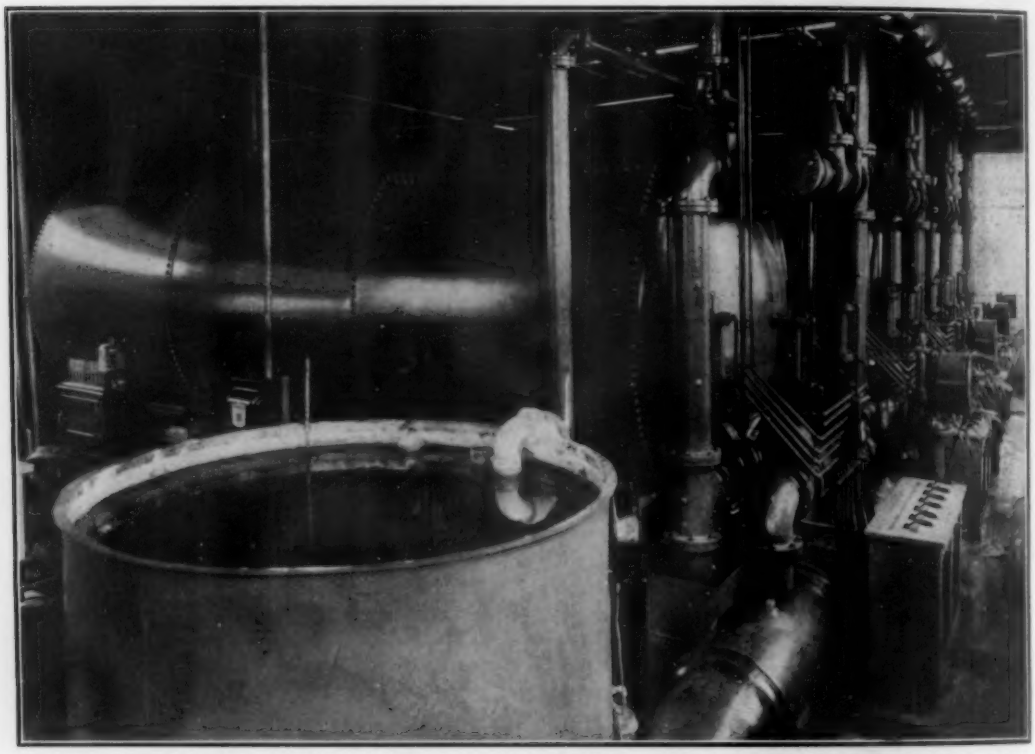
It was determined that manganese and crenothrix could be removed by aeration and filtration through coke, sand, and a catalyzer without softening, or that both of these could be removed and the water softened by use of the lime soda or Zeolite method. The decision was finally made to employ Zeolite, because any desired degree of softness is obtainable by this method down to zero; a comparison with the lime soda installation and operating costs gave that method no advantage; Zeolite is practically fool-proof and eliminates all danger of over- or under-dosing; and, lastly, the Zeolite plant could be built in very small space, which was a vital point, as the plant is so situated that additional real estate is almost impossible to secure.

The Zeolite Method

Zeolite is a natural mineral much resembling sand of a dark green color. It has the peculiar property of exchanging any alkaline base or metal it happens to hold for any other that may be presented to it in solution, and in water softening exchanges soda for the lime or magnesia of the hard water. The soda thus given up is periodically replaced by treating the mineral with a solution of common salt or sodium chloride, which causes a re-exchange of sodium and calcium, the sodium being part of the reconditioned mineral, and the calcium being washed away by flushing.

The New Plant

The plant installed by the Ohio Valley Water Company consists of four tanks, each 9 x 22 feet, and each containing 67,000 pounds of mineral, with an area of 200 square feet, operating at a rate of 4.6 gallons per square foot per minute and capable of softening to zero



INTERIOR OF McKEES ROCKS SOFTENING PLANT, SHOWING BRINE-SOLUTION TANK AT LEFT, BATTERY OF ZEOLITE TANKS IN BACKGROUND, WITH CONTROL TABLES, METERS, AND PIPING AT RIGHT

170,000 gallons of water of 12 grains hardness.

The Zeolite sand has 60 per cent finer than 0.51 millimeters and 10 per cent finer than 0.35 millimeters, with a uniformity coefficient of 1.46, but because it has friction losses just about double those of ordinary filter sand of the same effective size, open filters would have to be built with an effective head of about 16 feet, and for this reason the plant had to be built on much the same design as the old-fashioned pressure filters. The tanks work under a pressure of 5 pounds per square foot. Each tank is provided with the necessary

piping and a marble operating table placed in front of each unit.

Hard water enters the plant through a 20-inch line carried above the four units, and soft water is collected by a similar line placed below the units and is carried to a half-million-gallon detention basin, on the top of which the plant is built. This basin was part of the preexisting plant, and the use of its top solved the problem of finding space for the softening plant. The water is chlorinated as it leaves the softeners.

Operating Methods

Each tank will deliver 170,000 gallons of water in from 3 to 3½ hours, when it becomes exhausted and must be reconditioned. It is first backwashed at the rate of 6 gallons per square foot per minute to break up the mineral and remove any foreign matter or crenothrix, and is then given a measured dose of concentrated salt brine, which passes through the material in a downward direction and is diluted with a small portion of hard water. This rate is very slow, to permit the salt to be carried to all parts of the bed and allow a reasonable time for the phenomenon of exchange to take place. The calcium chloride produced as a by-product of the exchange and the excess salt, if any, is then removed by flushing, and the unit is ready to soften another batch of water.

A total of 1,005 pounds of salt is required to recondition each unit, and the total used for a normal day's operation of the plant amounts to 8 to 10 tons. To provide for the easy handling of this rather large quantity, a concrete brine tank was provided, with a spur track alongside so that salt could be delivered directly to it from the box cars in which it is received. The tank is 76 feet long, 8 feet wide, and 15 feet deep, and holds about five carloads. The bottom is hopper-shaped, with a French tile drain overlaid with gravel, and concentrated brine is pumped from the small collecting sump to a dosing tank inside the softener building. A small centrifugal pump is used and has a remote control switch located near the dosing tank. The dosing tank is 71 inches in diameter, contains 50 pounds of salt in solution per inch of depth, and is provided with a double hook gage for accurately measuring the dose required for each regeneration.

Schedule of Operation

The product of the Zeolite softener when operating normally is water of zero hardness, so long as the mineral contains sodium available for exchange, but after the limit of exchange power has been reached, any additional water put through passes unchanged. When operating at a rate that will produce four million gallons daily for the whole plant, each unit will deliver about 160,000 gallons of zero water before showing any sign of failure, followed by a "twilight zone" of 10,000 gallons ranging in hardness from zero to the total 12 grains of the raw water. Thus, the unit will deliver 170,000 gallons of soft water in 3 hours.

If it were desired to produce zero water only, each unit would be withdrawn from service and reconditioned as soon as failure was observed, but zero water is entirely too soft for comfortable use for household purposes, especially by people accustomed all their lives to the use of hard or moderately hard waters, and it was decided that for general purposes a water of from 60 to 70 parts per million would prove much more satisfactory.

Because of the presence of the crenothrix in the raw water, it is not desirable to by-pass a percentage of hard water to give the required residual hardness, and another scheme was worked out whereby the units are scheduled on a time basis and each allowed to run about an hour and a quarter beyond its softening period and pass hard water that is mixed with the soft water produced simultaneously by the other two or three units. The result is either one-third or one-fourth of the initial hardness, and the product can be held very uniformly at these figures.

The units work in an endless cycle which completes itself every five hours, the starting times of the units being spaced an hour and a quarter apart, each operating with the delivery of soft water for three hours, and of hard water for one and a quarter hours, and being out of service for three-quarters of an hour. The time schedules are laid out on a printed form, and the operators have merely to perform the operations as they fall due.

Such a schedule is easy to follow but does not make allowance for variations in pumping rates or initial hardness. To attempt to change the time factors of the schedules to conform to the variables would require constant juggling and make endless confusion for the operators, so better and simpler ways have been devised.

The pumping capacity of the plant and the storage supplies of the reservoir make it possible to pump 24 hours' requirements in from 18 to 20 hours and allow a shut-down period in which minor plant repairs can be made. This permits the plant to be run economically at full speed for a portion of the day, and variations in pumpings can be taken care of by

varying the pumping and idle periods.

About 1,000 pounds of salt are required to fully recondition each unit which delivers soft water for a period of three hours when the initial hardness is at its maximum of 12 grains. When the initial hardness falls below this figure, the quantity of salt brine used for reconditioning can be proportionately lessened to partially recondition the unit so that it still exhausts in three hours and preserves the schedule. This scheme has been used for nearly a year and appears to be entirely practical. It can be used also to take care of variations in pumping. When recently one of the storage reservoirs was removed from service for cleaning and constant pumping had to be maintained for several days at a very slow rate, the hook gages on the brine tanks were changed from 21 to 14 inches pro tem and replaced when full pumpage rate was resumed. No other changes had to be made, and the hardness of the product did not vary more than half a grain.

It would appear from this and many experiments made that the plant is very flexible and that it can be operated with a minimum of technical supervision.

Conclusion

The Zeolite is assumed to be indestructible and to retain its softening powers indefinitely. The writer has inspected an installation in a laundry that has seen daily use for ten years without replacing any mineral, and Robert Spurr Weston has comparative chemical analyses of the mineral from the McKees Rocks experimental plant after 400 days and a fresh sample from the factory that had differences so slight that they might be explained as errors in sampling. There is, however, a practically inexhaustible supply of the material available for replacement, should it be lost by mechanical accident or otherwise.

With a perpetual supply of water of initial purity and a softening method which not only appears to be safeguarded for the future, but removes the two objectionable elements of manganese and crenothrix as well, the water company officials and their engineers feel that as soon as the soft water has removed the present incrustation of manganese from the pipe lines, their serious troubles have been solved, for the present at least.

ACKNOWLEDGMENT.—Reprinted by courtesy of the *Water Works Journal;* illustrations by kindness of F. B. Beech, General Superintendent, Ohio Valley Water Company, McKees Rocks, Pa.

The Lighting of Residence Streets

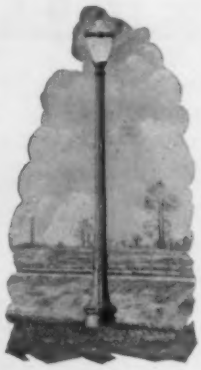
Lighting Requirements Less Severe, But Must Be Ample for Safety

WHERE residence streets carry a large amount of through traffic, they are in effect thoroughfares and should be lighted as such. In every city, however, there is a large percentage of street mileage known as residence territory, which is not used for through travel and therefore is not subject to any great amount of high-speed traffic. While the lighting requirements are not as severe as on the thoroughfares, nevertheless the illumination should insure that obstructions and serious breaks or defects in the pavement will be revealed, that children playing on the streets will readily be seen by an automobile driver when going at a fair rate of speed, and that turns, dead ends, and street intersections will be definitely marked. Any unsure footing on sidewalks should be rendered visible. Dense shadows from trees should be minimized; street signs and house numbers should be revealed. Enough light should be provided on front lawns and between houses to avoid dark hiding-places. At the same time, care should be exercised that equipment does not appear unduly bright from porches or upper-story windows.

A staggered arrangement of units is desirable in order to lessen tree-trunk shadows and to provide equal illumination on both sidewalks. The bracket unit has the same advantages on residence streets as on thoroughfares, and here, again, the prismatic refractor should be used to obtain more efficient utilization of light on the street. The refractor serves another advantageous purpose in that it reduces the amount of light on the porches and in the upper windows of the residences.

Recommended practice for the illumination in high-class residence districts in cities of 50,000 to 500,000 population where ornamental construction is desired, calls for one 4,000-lumen lamp per post, spaced 100 to 150 feet, staggered, and mounted 13 to 15 feet above the street surface for upright units, and 16 to 20 feet for bracket units, the brackets being 4 feet or more in length.

In well-populated residential districts not of the highest class, the size of the lamp may be reduced to 2,500 lumens and the spacing lengthened to 125 to 175 feet, the mounting height and arrangement of units remaining the same.



A LARGE VARIETY OF EQUIPMENT IS AVAILABLE TO MEET THE ESTHETIC REQUIREMENTS OF RESIDENCE STREETS

For well-populated residential districts in cities of less than 50,000 population, recommended practice calls for one 2,500- to 4,000-lumen lamp per post, spaced 150 to 200 feet, staggered. The mounting height for upright units is 13 to 15 feet, and for bracket units 16 to 20 feet, the bracket length being 4 feet.

In less desirable or sparsely populated residence districts using overhead construction, one 2,500- to 4,000-lumen lamp is used per post, spaced 200 to 300 feet and mounted at a height of 20 to 25 feet. The units are usually arranged on one side or with center suspension. This recommendation applies not only to cities of less than 50,000, but quite frequently applies to districts of similar character in larger cities.

Preventing Water-Hammer by Automatic Slow-down of Pumps

THE three large centrifugal pumping units in the new sewage disposal plant in Brooklyn, N. Y., are arranged for automatic slow-down to prevent hammer. This arrangement is operated as follows: The pump motors are automatically started by a float switch, and when this closes, an oil circuit breaker is closed, thus growing voltage on the primary of the motor. The motor then accelerates automatically until it reaches full speed.

When the pump motor is to be stopped, the float switch opens and a contactor drops out, thus inserting resistance in the motor secondary and thereby slowing it down. At the same time a definite time relay is energized, tripping after a predetermined time, thus opening the oil circuit breaker and shutting down the motor. The three pumps are driven by 125-horsepower, 4,150-volt slip-ring General Electric motors. This plant is one of the first with this equipment.

Trafficking in Humor

A Will and a Way

A headline says: "Speeding Tourist Crashes Through Billboard." His only chance to get a glimpse of the scenery.

—Altoona, Ia., *Tribune.*

But Where'll He Park the Bike?

We have reached the point where the canny motorist carries a bicycle along so he can ride to work after he finds a place to park.

—*Detroit Motor News.*

Tom Masson Says—

From the cradle to the grave will soon read from the incubator to the ambulance.

—*Collier's.*

An Uncommon Sign on the Common

A sign on Boston Common, placed strategically near the Navy Department's poster urging enlistment—the recruiting officer being close at hand—used to read:

KEEP OFF THE GRASS! IF YOU WANT TO ROAM, JOIN THE NAVY!

—*Contributed by Stephen Child.*

Good Morning, Judge

Judge—"So you tried to drive by the officer after he blew his whistle?"

Motorist—"Your Honor, I'm deaf."

Judge—"That may be, but you'll get your hearing in the morning. Next case."

—Quoted in *Denver.*

MUTT AND JEFF—

Last Words of Men, Some Famous and Some Foolish

By BUD FISHER

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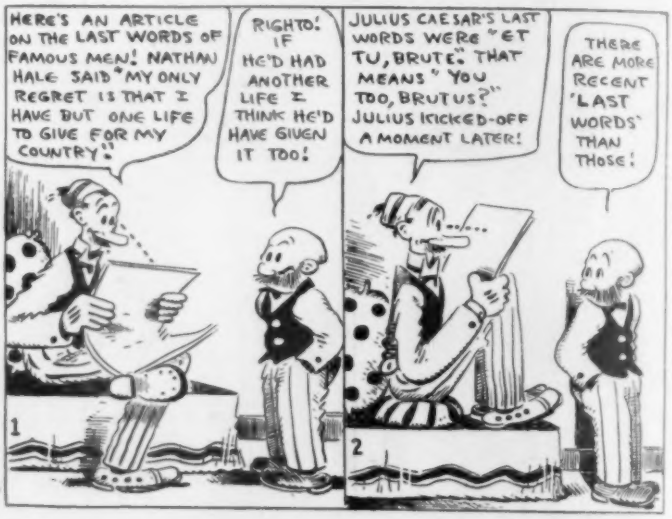

HERE'S AN ARTICLE ON THE LAST WORDS OF FAMOUS MEN! NATHAN HALE SAID "MY ONLY REGRET IS THAT I HAVE BUT ONE LIFE TO GIVE FOR MY COUNTRY!"
RIGHTO! IF HE'D HAD ANOTHER LIFE I THINK HE'D HAVE GIVEN IT TOO!
1
JULIUS CAESAR'S LAST WORDS WERE "ET TU, BRUTE." THAT MEANS "YOU TOO, BRUTUS?" JULIUS KICKED-OFF A MOMENT LATER!
THERE ARE MORE RECENT 'LAST WORDS' THAN THOSE!
2

UTTERED BY WHOM?
WELL, GUS GEEVEM'S BROTHER, 'BUGS. HE UTTERED THEM YESTERDAY!
3
I WAS MILKING THE COW IN THE PASTURE WHEN 'BUGS' DROVE BY IN HIS CAR! JUST THEN THE BROADWAY LIMITED WHISTLED!
4
TURNING TO ME 'BUGS' SAID, "WATCH ME BEAT THAT TRAIN TO THE CROSSING"! THOSE WERE HIS LAST WORDS!
5

To Reduce and Safeguard the Cutting of Paved Streets

To the Editor of THE AMERICAN CITY:

In connection with the extremely valuable constructive work constantly being instituted and promoted by THE AMERICAN CITY, I venture to call your attention to the question of the cutting of paved streets. As the American practice stands now, so far as I know it, a street is permanently improved and paved by one or other of the methods provided for meeting the cost of such improvement. This street may be in a thickly populated section where the connections from the utilities in the streets to the houses have already been made, or it may be in a new territory, or partly both.

Notice is usually given, at least in Pennsylvania, to abutting property owners, requiring them to make, repair, improve, or modernize their street connections, and in my experience such notices are usually disregarded. The street then being paved, the next step is to begin to cut it up, for various house connections. Repairs due to accident or other emergencies are of course inevitable and should not necessarily be penalized; but as I have seen the matter operate repeatedly, a fine stretch of asphalt paving is, within two or three years, cross-hatched by various trenches leading to houses erected following the completion of the paving, and not infrequently by new mains laid either for water, gas or electric conduits, or even sewers. I have never seen a repair job which left the cut street in durable, sightly condition, and after a few years of such treatment a street is a wreck, its only merit being that it is better than a mud road. Eventually, when this orgy of cutting is over, temporarily at least, the community virtually repaves in the extent of the repairs involved.

I propose to you a study of the whole situation, from the standpoint of progressive communities, to ascertain whether there is any body of practice toward a better handling of this problem. In order that it may be approached more logically, I am separating the items that need to be taken into account.

Three Suggestions for Consideration

In the first instance, the notice to make connections with the mains in the street usually given, in Pennsylvania, to property owners, should be followed by vigorous personal attention, where necessary and possible, so that the property owners would understand that they were being seriously penalized in neglecting the notices. It should be preceded, however, by such a forwarding-looking consideration of the main street, and by such compulsion, if that is required, on the public utilities companies, as would prevent the steam-heat company or the gas company or the electric light company from damaging a street through belated putting down of mains that should have gone in before the paving of the street.

Then, it seems to me, there should be a careful study as to costs and methods looking toward duplicate services on either side of the street to prevent the cutting of the street surface, such duplicate service being near the curb or even in the grass-plot, if that is wide enough and if such action does not totally destroy the opportunity for trees. It is conceivable that all these services could be grouped just outside the curb—or under it, for that matter—access to them being through the sidewalk strip and not by way of the paved surface of the street.

Another factor might be introduced into this study. Many city codes enforce complete and separate connections for each house, and this means, in the case of pushing the paving ahead of the houses, either the complete plotting of the property long in advance, which is difficult and sometimes impracticable, or

How Has Your City Solved These Problems?

The American City will be glad to receive comments from its readers on the suggestions offered by Dr. McFarland in the accompanying letter. Information as to methods which are successfully reducing the cutting of paved streets and methods of assuring the proper restoration of the street surface when cutting is unavoidably done will be especially welcome. In The Municipal Index for 1925, pages 294-296, under the heading "Control of Pavement Openings," will be found data on this subject based on an investigation made by the Highways Committee of the Philadelphia Chamber of Commerce.

the cross-cutting of the street as above complained of. To meet this situation, I have recently proposed, in a discussion of the matter with the group of experts included in Secretary Hoover's Zoning and City Planning Committee, that a general or tentative plotting be arranged by the city planning authorities when such streets are paved, with the understanding that services from the mains be carried to the curb or grass-plot line on either side, not necessarily for every separate dwelling possible to be erected along the street but for *each two,* these branches from the main being in every case capable of carrying two, and ending in the tee or suitable fixture nearest the house-line, with the necessary stocks to protect the individual property. I have not found any sanitary engineer ready to insist that such service would be in any way a disadvantage, and the compulsion on the property owner to install these services prior to the paving of the street would be more reasonable if he were given opportunity to branch at right angles near a determined curb-line or sidewalk-line, or even right next to the sidewalk-line inside the property to the various homes to be served.

Restoring the Street Surface When Cutting Is Unavoidably Done

Given, then, the opportunity to prevent this senseless proceeding of destroying public value, it would seem worth while to get details as to how, in the cutting unavoidably done, the street surface might be restored to proper service conditions at the earliest practicable moment. Governing regulations and ordinances usually provide that those opening trenches in the street for any purpose give some sort of bond or near-bond to restore it, but these provisions, I think, are seldom enforced. These conditions likewise provide that there shall be adequate tamping as these excavations are filled in, but the adequacy of the tamping is seldom enforced by inspection. In some places it is the custom to permit a trench filled slightly above the street level to settle, leaving a mud-hole, to the public disadvantage. In one case within my knowledge, after six months of such exposure, the street surface was filled by the city itself, in a bitulithic paving job that was in excellent order, with unfinished cement concrete, raised about an inch above the average street level, for what reason no one could tell. Here a study of conditions, remedies, and suggestions ought to bring out a possible standardized method of doing better things.

I trust I have not set up an unreasonable program. If you think it worth while to pursue it, it might not be amiss to interest the proper division in the Department of Commerce toward pursuing the subject still further through capable engineering consideration, as has been done, for example, in the direction of plumbing regulations and the like.

J. HORACE MCFARLAND.

Advantages of Small-Town Incorporation

By William J. Locke

Executive Secretary, League of California Municipalities

THE question is frequently asked: Of what advantage is it to the people of a small town, having a population of from 500 to 1,000, to incorporate as a municipality?

Among those who ask the question are many who are inclined to measure any advantage that might be gained in dollars and cents and then offset it by the dollars and cents they would have to pay as municipal taxes.

It is impossible to measure the advantages of incorporation in the terms of finance, just as it is impossible to measure the value that education confers upon the human race by the cost of maintaining schools. It is not a matter for comparison.

It is a well-known fact that the bringing together of a number of people in the form of a social body begets certain necessities which are peculiar to that very circumstance. One man does not require a sewer system, but such an institution becomes a necessity when a community is established and a great many people begin living together in close physical relationship. Neither does a small community require a transportation system, a necessity, however, when the small town becomes a large city.

This illustrates the point that must be kept in mind, to wit, that a community is like an organism, an entity having its own existence to take care of, irrespective of the individual wishes of its constituent members. Its needs must be satisfied, otherwise it will cease to thrive and grow. It will become anemic, so to speak, and finally retrograde, just as the

human body will retrograde if its demands are not satisfied. The question then for a community to determine is this: Are our community necessities being fully satisfied?

Let us analyze these necessities. The first need of a community is a highway, a means by which one inhabitant may reach another inhabitant. Two families may require a connecting pathway only, whereas one hundred families will need a street system. Then follows another question: Is our street system maintained as we want it? That is to say: Are the streets, properly graded, drained, paved, sprinkled, and lighted at night, and are there proper sidewalks and crosswalks? Are there trees along the streets? Do things commend themselves to our senses? If not, then the inquiry is made—Who can do these things for us? Can the county supply those needs? The answer will be that the county is organized for serving a rural community and not an urban center. If you want those things, you must get them yourselves. In this situation a trial is often made to secure such needs by voluntary cooperation. This method may be partially successful for a time, but it soon develops that voluntary contributions for the public good are unsatisfactory. The public-spirited and generous will contribute more than their share, while others equally able will give little or nothing.

Therefore, it is to secure community necessities at an equality of cost that municipalities are organized as political bodies. They are vested by law with the power to do the things that the community desired to have done, and to distribute the cost equitably over the entire community by the power of taxation. No other form of government can serve it so completely or satisfactorily.

The things which a municipality may do are many and its powers are sufficiently extensive to include not only the things required by a small community, but all those that may from time to time be demanded by reason of its growth. A community does not have to be very large before it requires improved sanitation. It needs sewers and health regulations which only a municipality can provide. At the same time it must have an ample water-supply. The time is now at hand when private capital cannot be relied upon to properly safeguard the public interest in this respect. A municipal water-supply means an abundance of pure water for domestic purposes, also for sewer flushing, street sprinkling, the irrigation of lawns and gardens, and the consequent improvement of the town in general.

There is a great satisfaction in having a town look attractive, with neatly kept streets, bordered with ornamental trees, flowers, or grass. Besides, it is a great factor in enhancing the value of real property, for the reason that other people will want to make their home in such a town.

Then there are many other "community needs," such as a fire department, public library, police protection, perhaps some means of recreation like a park or playground, and possibly a public meeting place such as a town hall. These things can be secured only through the instrumentality of a municipal corporation. And if a community aspires to future growth, if it is ambitious to be a factor in promoting civilization, it must satisfy these community needs. The earlier it commences to do so the more rapidly it will grow.

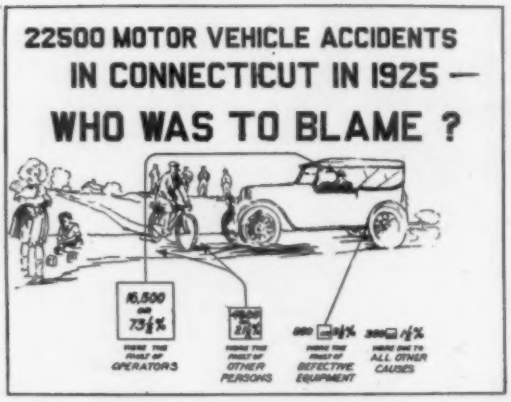
The method of incorporating a town is provided by law. It is a legal procedure and should be conducted by a lawyer, as the requirements of the law must be carefully observed, for errors sometimes produce serious consequences. The lawyer selected to conduct the proceedings should be one who has had previous experience or be in a position to consult with one who has had such experience. The law requires a municipality to have at least five hundred inhabitants.

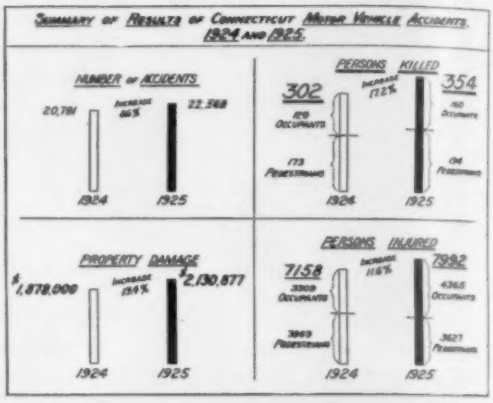
A Handbook for Officials of Small Municipalities

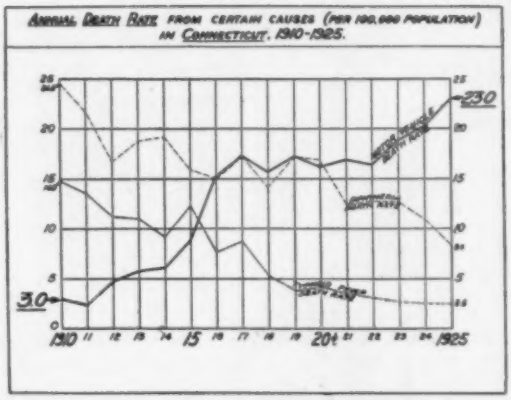
The League of California Municipalities is performing an important service to the small cities of the state through the publication of a Handbook for City Officials of Fifth and Sixth Class Cities, from the 1926 edition of which the accompanying article is quoted.

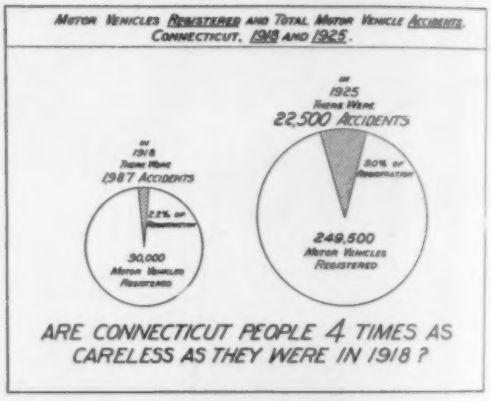
The handbook, which is edited by William J. Locke, Executive Secretary of the League, comprises a collection of those sections of the constitution and general laws of California which concern municipalities, also that portion of the municipal corporation act which constitutes the basic law under which the fifth and sixth class cities of the state are governed. In addition thereto, it contains much valuable information for the officials of newly incorporated towns, including a number of model forms and ordinances. A model city charter, with comments, and instructions how to proceed and obtain a charter, has been added to the 1926 edition.

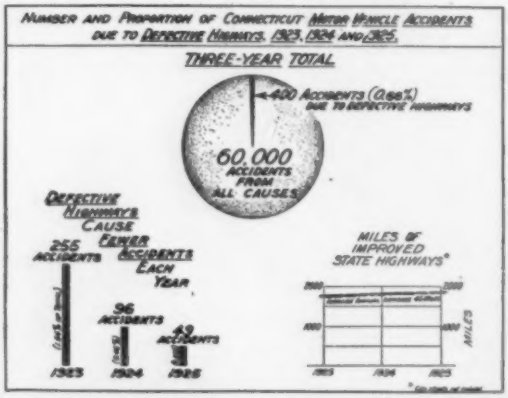
Accident Statistics Graphically Shown

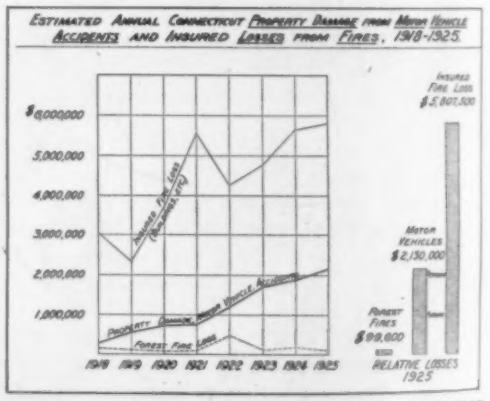

22500 MOTOR VEHICLE ACCIDENTS
IN CONNECTICUT IN 1925 —
WHO WAS TO BLAME ?
16,500 OR 73½%
WHERE THE FAULT OF OPERATORS
WHERE THE FAULT OF OTHER PERSONS
WHERE THE FAULT OF DEFECTIVE EQUIPMENT
WHERE DUE TO ALL OTHER CAUSES






MOTOR VEHICLES REGISTERED AND TOTAL MOTOR VEHICLE ACCIDENTS, CONNECTICUT, 1918 AND 1925.
IN 1918 THERE WERE 1987 ACCIDENTS
2.2% OF REGISTRATION
30,000 MOTOR VEHICLES REGISTERED
IN 1925 THERE WERE 22,500 ACCIDENTS
9.0% OF REGISTRATION
249,500 MOTOR VEHICLES REGISTERED
ARE CONNECTICUT PEOPLE 4 TIMES AS CARELESS AS THEY WERE IN 1918 ?


NUMBER AND PROPORTION OF CONNECTICUT MOTOR VEHICLE ACCIDENTS DUE TO DEFECTIVE HIGHWAYS, 1923, 1924 AND 1925.
THREE-YEAR TOTAL
400 ACCIDENTS (0.66%) DUE TO DEFECTIVE HIGHWAYS
60,000 ACCIDENTS FROM ALL CAUSES
DEFECTIVE HIGHWAYS CAUSE EITHER ACCIDENTS EACH YEAR
255 ACCIDENTS
96 ACCIDENTS
49 ACCIDENTS
1923
1924
1925
MILES OF IMPROVED STATE HIGHWAYS*
MILES



A FEW OF THE CHARTS USED TO VISUALIZE THE FACTS PRESENTED IN "A STUDY OF MOTOR VEHICLE ACCIDENTS IN THE STATE OF CONNECTICUT, 1924 AND 1925"

THE publication of this new report comes as a sequel to the general conference on the motor vehicle accident situation in Connecticut, held under the joint auspices of Yale University and the State Department of Motor Vehicles in April, 1924, for the purpose of securing for the state the best thought and advice obtainable upon which to base methods of accident prevention. Joint participants with the state in this endeavor were the Department of Civil Engineering of Yale University and the Hartley Corporation, a Connecticut philanthropic and educational institution which financed the work. During the two years which have elapsed, the lessons learned from the conference have been applied by the Department of Motor Vehicles, with both professional and volunteer cooperation.

The traffic accident situation has now again been analyzed under auspices similar to those of two years ago, and the statistics, which are founded upon actual accident reports of an estimated 90 per cent of all motor-vehicle operators involved, are presented by Professor Richard Shelton Kirby of Yale University. A summary of the disciplinary action in motor-vehicle cases and a description of the statistical record system developed by the State Department have been included. Copies of the pamphlet may be secured through application to the Commissioner of Motor Vehicles, Hartford, Conn.

Building a County-wide Program of Development

"The Lassen County Plan"

By William C. O'Donnell

Secretary-Manager, Lassen County Chamber of Commerce, Susanville, Calif.

THAT every civic organization should have a definite program of activity, is a principle too widely accepted to demand any extended discussion. Because of the work of such organizations as the American City Bureau, the Chamber of Commerce of the United States, and various state chambers of commerce, the necessity for a definite "Program of Work" for every chamber of commerce has become so thoroughly realized that the subject is no longer a matter for debate.

The best methods of building such programs, however, are now, and for a long time to come will be, the subject of much difference of opinion. Many schemes have been devised for the building of a program, but each has had its faults.

Even the "group" method, which has been most widely used of all, has very definite drawbacks. Under this method the membership of an organization is arbitrarily divided into groups of convenient and similar size, with a leader for each. The groups meet in round-table fashion, and without discussion each member is asked to fill in on a prepared blank his ideas or wishes as to (1) the thing of most importance to the community that he believes the Chamber of Commerce should undertake, and (2) the thing of most benefit to himself or his business that the Chamber of Commerce should strive to accomplish. The results of this canvass are tabulated, and those things receiving greatest mention are combined into a program of work.

Under another plan of program building an individual or committee will make up a list of the possible needs of the community. This list is then submitted to the members of the organization as a sort of referendum, with instructions to the members to check the items in the order of their importance. The items receiving the highest number of checks are combined into a program.

In other instances a program is made up in short order by a committee or by the Board of Directors, and the entire membership is asked to accept it.

Many variations of these three methods have been, and still are, used.

Faults Common to All of These Methods

A number of faults are common to all of these methods in greater or less degree and may be summarized as follows:

1. At best the programs are too hastily built.
2. Such programs too often are based on wishes or hobbies of individuals rather than on a real understanding of community needs.
3. The programs are frequently largely impracticable.
4. They are nearly always too ambitious.
5. Although in many instances, particularly with the "group" method, attempt is made to build a three-year program, the impression persists that the program as adopted is for a period of one year. Thus the Chamber of Commerce is given an impossible goal. In this case, regardless of the amount of good accomplished, the Chamber of Commerce is adjudged as having fallen short of its promise.
6. As a general thing, too few people participate in its building, and the program consequently lacks popularity.

These faults are becoming more or less generally realized, and the desire to eliminate them, and yet retain the benefits of a definite program, has inspired much thought. The present tendency is toward broader and more fundamentally sound programs.

To avoid the last enumerated fault, the programs are now being thought of more and more as *community* programs rather than as merely chamber of commerce programs. The application of this idea is more practicable in some instances than in others.

Outstanding Requirements of a Community Program

The two outstanding requirements of a program of the newer type are that it must be community-wide in its scope, and that it must be a long-time program, looking forward one, three, five, ten, and in some respects as much as twenty-five years.

The method of building such a program is tedious, but not complicated. Several things are essential to success:

1. The program must be based on an intelligent analysis of actual needs.
2. The needs of every section and interest of the community must be thoroughly and impartially considered.

3. The needs of various sections and interests of the community must be properly coordinated.

4. The needs must be carefully scrutinized with respect to the practicability of their fulfillment.

5. The program must be built strictly on the findings.

6. The program must look forward one, three, five, ten years, at least, and even farther if possible.

As regards the analysis of actual needs, mere wishes and hobbies of individuals must be disregarded. Where deemed advisable, the analysis of needs must be based on a fact survey, thoughtfully considered. No trouble should be spared in getting the viewpoint of the thinking people of the community, and in ferreting out pertinent facts.

Every section of the community and every major interest must be taken into consideration. A well-rounded-out program that will result in a well-rounded-out development is the goal.

When the analyses of the needs of various sections and interests of the community have been completed, the various analyses must then be carefully studied in regard to their bearing on each other, duplications must be eliminated, and the various findings must be coordinated and combined into one general community-wide analysis.

When this coordination has been completed, the needs should be carefully considered with reference to their fulfillment, and must be given a severe practicability test; and after they have been considered as to their practicability, the actual program must be formulated with the idea of meeting the needs in the most practicable manner.

Lassen County as an Example

The description of a particular instance of the building of such a program will best illustrate the method to be followed:

Lassen County, Calif., happens to be so situated that the successful operation of a county-wide chamber of commerce is possible. It also happens that the County Chamber of Commerce is the only chamber of commerce in the entire county, although there are other civic or semi-civic organizations with more limited functions.

The existence of a truly county-wide chamber of commerce in Lassen County is made possible by reason of the fact that although there are two towns in the county of nearly equal size, one of them is based upon a single tremendous industry, owned and controlled by one institution and capable of taking care of all of its local needs without the help of a chamber of commerce, and the other needs of this town are largely coincident with, or complementary to, the needs of the other parts of the county. Outside of the two larger towns, the population of the country is rural or is found in a number of small villages, each too small to support a separate chamber of commerce.

Because of its relationship to the entire county, it is manifestly proper that the Lassen County Chamber of Commerce should act as the initiating body for the building of the county-wide program, and should continue to function as the central clearing-house during the time of the building of the program.

The matter was first gone into thoroughly by a small committee, and the method to be followed was adopted by the Board of Directors.

By referring to the accompanying diagram, it will be noted that all official bodies having a bearing on the situation, the major interests of the county, such as industry, commerce, and agriculture, and the chief geographical divisions of the county, were carefully listed and taken into consideration.

The existing organizations and official bodies were each asked either to act of themselves or to appoint committees to act as their representatives for the purposes outlined. Then committees of seven members were selected, after consultation and careful consideration, to represent each of the various major interests and geographical divisions of the county not otherwise represented.

HOW THE COMMITTEES ARE WORKING

These committees have been organized and are now engaged in carrying out their work.

The committees have been instructed to hold public hearings, make surveys, conduct referendums, give wide publicity to their activities, and take advantage of every possible method to stimulate thought, and to obtain facts regarding present and future needs of the county; then, having completed this part of their work, to analyze carefully their findings and formulate their analysis into a definite and, if possible, a brief report.

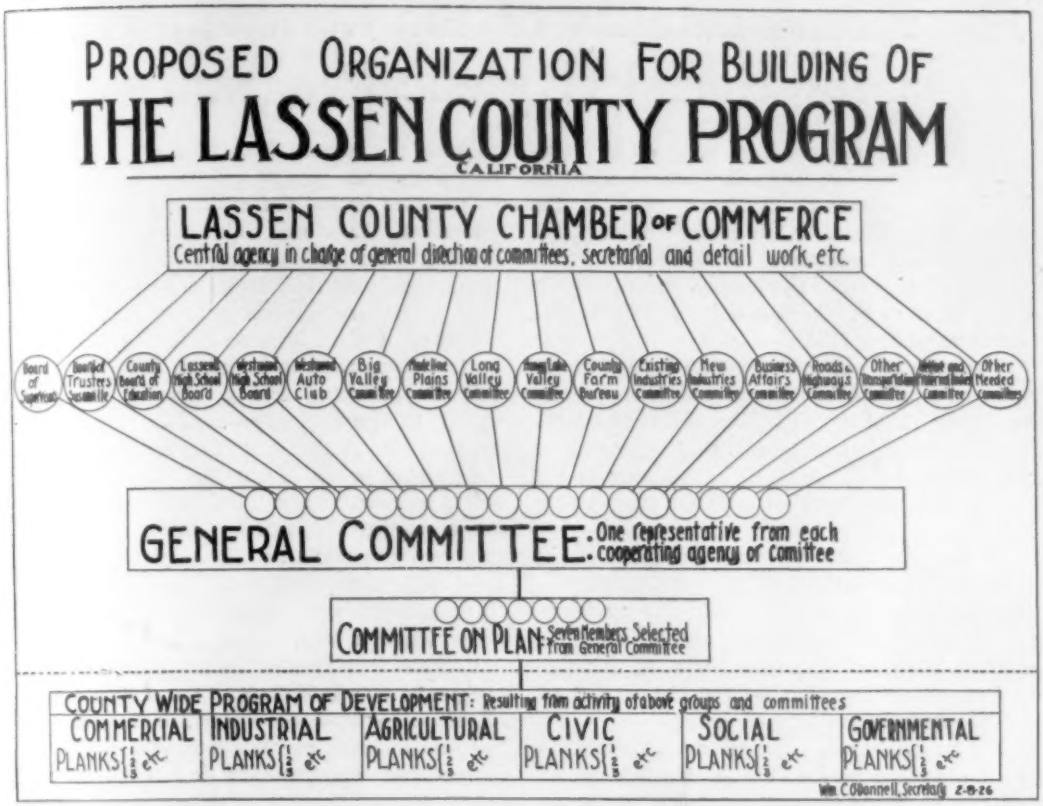
There are eighteen groups or committees engaged in this work. When its analysis is completed, each committee will select one from its number to represent the particular committee on the general committee. The President and Secretary of the Chamber of Commerce are ex-officio members of the general committee.

The general committee will receive and carefully consider the analysis and report of each of the special committees. The general committee will eliminate duplications, coordinate findings, scrutinize the needs outlined with respect to the practicability of their fulfillment, and will combine all of the reports into one general analysis.

Then, as a matter of expediency, when the work of coordination is completed, seven members of the larger committee, including the President and Secretary of the Chamber of Commerce, will be selected and charged with the definite task of formulating the program.

This program will be based strictly on the general analysis of present and future county needs, and will probably be formulated under the six heads as indicated—commercial, industrial, agricultural, civic, social, and governmental.

Even though the Chamber of Commerce in Lassen County is truly county-wide, the resulting program will be bigger than, and beyond the scope of, any one organization, and so, although the Chamber of Commerce will continue to act as the central agency, care will be taken to impress the fact that the program is a county program, and not just a Chamber of Commerce program.


PROPOSED ORGANIZATION FOR BUILDING OF
THE LASSEN COUNTY PROGRAM
CALIFORNIA
LASSEN COUNTY CHAMBER OF COMMERCE
Central agency in charge of general direction of committees, secretarial and detail work, etc.
Board of Supervisors
Unified Trustees Susanville
County Board of Education
Lassen High School Board
Westwood High School Board
Westwood Auto Club
Big Valley Committee
Madeline Plains Committee
Long Valley Committee
Honey Lake Valley Committee
County Farm Bureau
Existing Industries Committee
New Industries Committee
Business Affairs Committee
Roads & Highways Committee
Other Transportation Committee
Other Needed Committees
GENERAL COMMITTEE: One representative from each cooperating agency or committee
COMMITTEE ON PLAN: Seven Members Selected from General Committee
COUNTY WIDE PROGRAM OF DEVELOPMENT: Resulting from activity of above groups and committees
COMMERCIAL PLANKS { 1 2 3 etc
INDUSTRIAL PLANKS { 1 2 3 etc
AGRICULTURAL PLANKS { 1 2 3 etc
CIVIC PLANKS { 1 2 3 etc
SOCIAL PLANKS { 1 2 3 etc
GOVERNMENTAL PLANKS { 1 2 3 etc
Wm C O'Donnell, Secretary 2-8-26

Then parts of the program will be referred back to every group and organization that participated in its building, and the Chamber of Commerce will accept, as its individual program, that part particularly appertaining to a chamber of commerce, and will proceed to set about putting it into effect.

BENEFICIAL RESULTS EXPECTED

It is too soon to begin counting results from the building of the program. However, a wide interest has been aroused, the cooperation of many agencies has been secured, and it is expected that the following beneficial results will accrue from this activity:

1. Many people will be stimulated to think earnestly about the present and future needs of the county.
2. A very illuminating and interesting array of facts regarding the county will be gathered together.
3. A most thoroughgoing analysis will be made of the needs of the county.
4. A program will be built that is based not on fancies, but on actual needs.
5. This program will look forward one, three, five, ten and even more years.
6. A program will be built that, because of the nature of its building and the many people participating, should be generally accepted by individuals and organizations throughout the county.
7. Efforts of various organizations and individuals toward county development will be coordinated and combined, resulting in more efficient and effective effort.
8. And—of great importance to the Chamber of Commerce—the building of such a long-time program will create such a feeling in the community that the permanency of existence of the Chamber of Commerce as an institution will be insured, and the Chamber of Commerce will be relieved of the necessity of doing many things merely through expediency.

Although the work of building the program has not as yet neared completion, certain definite results have already been obtained.

The Chamber of Commerce has secured a very considerable increase in support and confidence, and throughout the county there is a more general feeling of friendliness towards the organization than has ever before existed. This naturally tends to increase the Chamber's efficiency. Of equal importance is the fact that this and other related activities of the Chamber of Commerce have increased the effective cooperation between town and country to a noteworthy extent.

The work of program building has proceeded satisfactorily, but certain difficulties have been encountered, the chief of which is a tendency on the part of the persons participating to consider present needs to too great an extent, and not to give enough thought to the future. This tendency is being overcome by prolonging the period for the building of the program; it is now expected that the work will be completed before January 1.

It is also realized that, however well the work may be done, year-to-year developments will bring about unforeseen conditions that will have to be met as they arise, and it is anticipated that the program will have to be revised perhaps annually.

Regardless of that, the awakened interest and coordinated activity for county development will compensate many times for all the effort involved.

The Responsibility of the Community in the Social Hygiene Program

ADULTS and children make up the community. The spirit and management of the community, however, rests in the hands of the adults. If the general adult public opinion of a community is loose and gross, the children of that community can hardly be expected to mold for themselves high and true ideals regarding life.

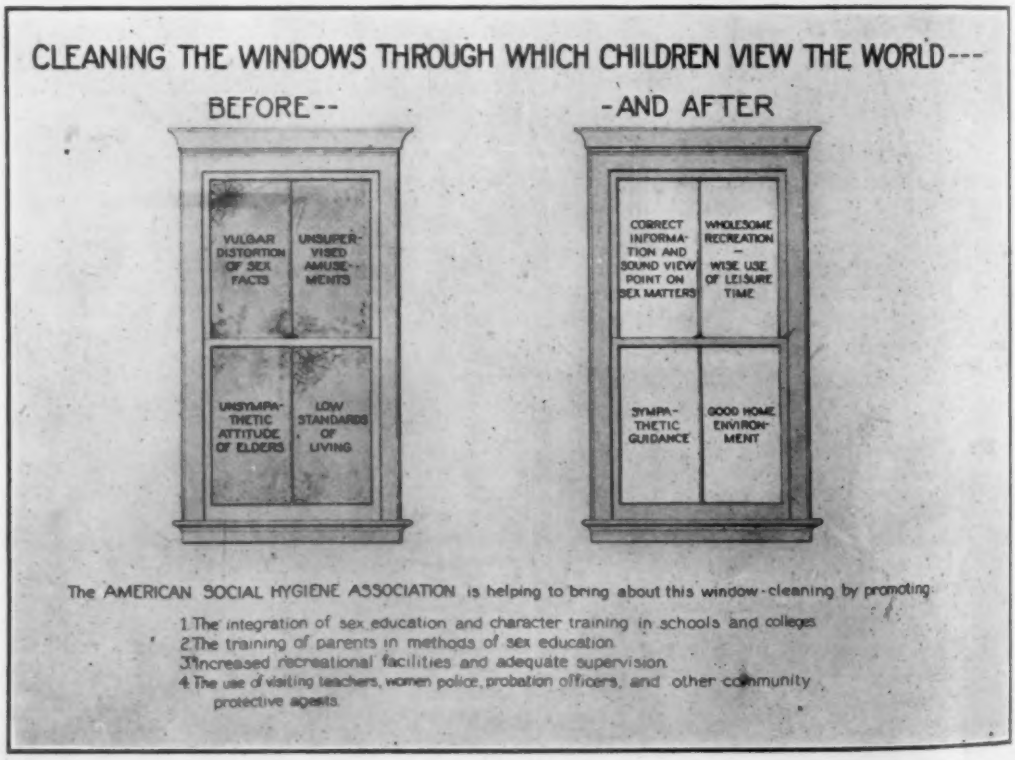
The task of educating human beings in respect to sex-social needs and progress presents two great problems. The first is the re-education of adults whose youth was neglected or mishandled in this matter. The second is the proper sex education of children and young people.

By sex education is meant bringing to the individual at every step of his development the best knowledge, the most helpful experience, the most powerful incentives, and the most inspiring examples to enable him to use his normal sex endowment for the enrichment of his life and the welfare of society.

The child lives in a sexual environment. If the impressions he receives are not interpreted for him in terms of high value, he may piece together for himself doubtful and unwholesome interpretations. We do not have the choice as to whether or not our children shall have sex education. They will. The choice we have is whether the dominating, character-forming sex impressions shall be good or bad.

If a community would improve its sex-social conditions and its level of education, three important steps need to be taken. The first is to interest, convince, and prepare a managing group of leading representative community people. The second is to arouse and convince the general public. Lectures, moving pictures, newspaper articles, exhibits, all contribute toward popular education. Third, the special community agencies must be inspired to assume their part and competent individuals within these agencies must be trained in the general social hygiene task.

Recreation, play, and the use of leisure time are profoundly important in the influence upon all character and conduct, including sex. It becomes the task of the community to provide recreational opportunities for children and young people; then to safeguard these facili-


CLEANING THE WINDOWS THROUGH WHICH CHILDREN VIEW THE WORLD---
BEFORE--
VULGAR DISTORTION OF SEX FACTS
UNSUPERVISED AMUSEMENTS
UNSYMPATHETIC ATTITUDE OF ELDERS
LOW STANDARDS OF LIVING
-AND AFTER
CORRECT INFORMATION AND SOUND VIEW POINT ON SEX MATTERS
WHOLESOME RECREATION — WISE USE OF LEISURE TIME
SYMPATHETIC GUIDANCE
GOOD HOME ENVIRONMENT
The AMERICAN SOCIAL HYGIENE ASSOCIATION is helping to bring about this window-cleaning by promoting
1 The integration of sex education and character training in schools and colleges
2 The training of parents in methods of sex education
3 Increased recreational facilities and adequate supervision
4 The use of visiting teachers, women police, probation officers, and other community protective agents.

ties by wise and adequate leadership and supervision. In the general life of the successful community the sympathetic and capable visiting teacher, the kindly policewoman, and the understanding probation officer are indispensable.

No single community agency can care for the child at all periods of his development. It is an all-community problem. It demands an all-community program, dependent upon the home, the schools, the church, the health agencies, the press, local government, playground and organized amusements, and all societies and associations for the physical, mental, recreational, social, or religious training of children and young people.

The American Social Hygiene Association, 370 Seventh Avenue, New York City, is the representative national organization dealing with problems constituting the general field of social hygiene. It has prepared special material which is intended to introduce the adult to his community problems, and through literature, consultations, and lectures, stands ready and eager to assist individuals, groups, and communities to solve their special sex-social difficulties.

The Place of the City in Stabilizing Employment

By Mary Van Kleeck

Chairman, Committee on Governmental Labor Statistics, American Statistical Association

IN periods of business depression, the city and its institutions have always had to carry the burden of relief for the unemployed. The city, too, should have its place in the more encouraging task of seeking to prevent unemployment. The large majority of American communities, however, lack the facts necessary for action, either to develop wisely a program of relief, or to study the causes of fluctuations in business activity which throw wage-earners out of work. To work out a plan whereby governmental bureaus will supply the essential information on changes in numbers employed and in total earnings, industry by industry, for the country as a whole, for each state, and for each industrial city, is the aim of the Committee on Governmental Labor Statistics of the American Statistical Association. Its recommendations are embodied in a report to be published shortly by the Russell Sage Foundation under the title, "Employment Statistics for the United States."

For local relief, local data are sufficient. But for constructive leadership in business and finance, business men must have information about their own industries throughout the nation. They need similar facts about the industries from which they buy and to which they sell. Likewise, municipal officials, responsible for planning the business of the city, need information about changes in numbers employed and in wage-earners' income in their own community. To interpret the facts fully, they must know whether the local situation is peculiar, or widespread; whether temporary, due to local causes, or a reflection of forces which are operating in business generally.

The plan proposed by the Committee is simple and inexpensive both for the governmental bureau collecting the information and for the business reporting it. It calls for answers to two primary questions: (1) How many were on your payroll in the payroll period nearest the 15th of this month? (2) What was the amount of your total payroll? These facts are reported by a representative group of firms to the state department of labor, which tabulates them and makes them public for each industry in the state as a whole and for certain cities, always concealing, of course, the identity of an individual establishment. At the same time, a fair sample of the reports is sent to the Federal Bureau of Labor Statistics which publishes them for the country as a whole and for large geographical subdivisions. These national figures are confined to manufacturing, though a summary for the railroads is printed from reports made to the Interstate Commerce Commission. The Department of Agriculture is experimenting with reports on employment on farms, and certain states are extending their work to the building industries and retail trade.

The members of the Committee include the statisticians who are collecting information on employment in federal and state bureaus and those who are using it in banks, business establishments, and universities. Since the Committee began work, at the instigation of the Committee on Unemployment and Business Cycles, appointed by Secretary Hoover, with Owen D. Young as Chairman, to carry fur-

ther the work of the President's Conference on Unemployment in 1921, the monthly collection of data has notably increased. In 1921, the employment figures of the Federal Bureau of Labor Statistics covered half a million wage-earners in thirteen industries; they now cover nearly three million in more than fifty industries. The states cooperating by collecting data for the Federal Bureau, and at the same time publishing the facts for their own industries, included in 1921 only New York and Wisconsin. To these two have since been added Illinois, Massachusetts, Maryland, and California; and in addition, though not in cooperation with the Federal Bureau, similar data are gathered by Pennsylvania, Iowa, Oklahoma, and by Federal Reserve Banks in Philadelphia, Chicago, and San Francisco in states in their areas where state bureaus do not collect the information. Within this period several state departments of labor have begun publishing the information for cities. They have been influenced to see the value of these local data by the previous work of the Cleveland Chamber of Commerce, the Detroit Employers' Association, and the Bridgeport Manufacturers' Association, which began gathering the facts at frequent intervals from their own local industries in 1921.

The plan is feasible and has been tested by experience. But to give a reliable picture of employment it must be extended to other industries and to other states and cities. To carry out the plan requires the interest and cooperation of those who have come to know how vital these economic facts are as a guide in wisely developing the industrial life of a twentieth century city.

Sidewalk Arcade Affords Traffic Relief

By H. W. Casler

IN the new 32-story West Street building of the New York Telephone Company, the largest telephone building in the world, a feature of exceptional interest is the arcade extending the entire length of the Vesey Street side. This arcade, which is something of a departure in big building construction, has solved the problem of providing adequate and safe sidewalk space and more room for vehicular traffic in a location where the original street was narrow. It has also permitted a larger base for the building than would have been possible otherwise.

The old curb line of Vesey Street was moved back 8 feet, and the building limits were made 3 feet inside the new curb line set by the city officials, thus making Vesey Street 11 feet wider and better able to accommodate the increasing heavy traffic. The arcade is 16 feet wide, 19 feet high and 252 feet in length, providing a wide covered sidewalk which forms one of the most comfortable shopping fronts in New York.

Extending the entire length of the arcade at intervals of 20 feet, are twelve arches supported by brick piers 8 feet wide with granite bases and decorative limestone facings. At either end of the arcade is a similar arch. Facing on the arcade and between each pair of arches is a store front. The value of the stores is greatly enhanced by the attractiveness of the arcade, which forms a comfortable and sheltered thoroughfare for the traveling public going to and from the New Jersey ferries.

Lighting for the covered sidewalk arcade is provided by twelve fixtures, one at the peak of each convex nave inside the arches. The store window and door frames and lintels are of bronze, and the wide pavement of the arcade is of cement.

The arcade plan is likely to be copied in the construction of many large office buildings in the future, because of its economical features and the desirability of having wide sheltered sidewalks on streets in the downtown section where pedestrian traffic is invariably heavy during the morning and evening hours.

The sidewalk arcade was planned in cooperation with New York City officials. The telephone company agreed to provide and maintain a sidewalk of at least the required width of ten feet on the entire south side of Vesey Street, extending for the full length of the block. The maintenance includes adequate lighting of the arcade sidewalk by the telephone company.

Arthur S. Tuttle, Chief Engineer of the Board of Estimate of New York City and a

McKenzie, Voorhees and Gmelin, Architects; Marc Eidlitz & Son, Inc., Contractors

SIDEWALK ARCADE ON THE VESEY STREET SIDE OF THE NEW WEST STREET BUILDING OF THE NEW YORK TELEPHONE COMPANY

View showing the wide sidewalk, and arches built about the structural steel work supporting the building

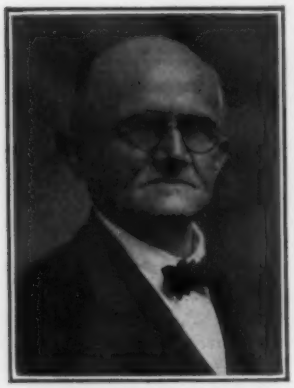
student of traffic problems and means of relieving traffic congestion, recently stated that the arcade is a relief measure which may be applied to many congested streets of New York City, giving increased sidewalk space and at the same time enabling the city to widen roadways for traffic. In this connection Mr. Tuttle said:

"Arcaded sidewalks should be introduced, and the entire present width of the congested streets made available for vehicular traffic. By arcading many of these streets, the capacity for vehicular use could be really doubled.

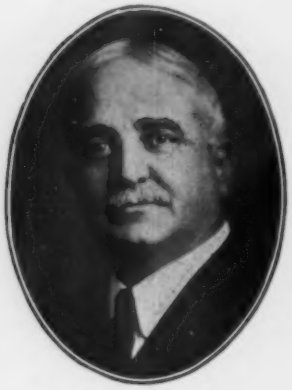
"The arcade treatment offers these advantages. It affords maximum relief for vehicular traffic and withdraws a minimum area from private use and from taxation. The sidewalks should be done away with in principal streets, and arcades constructed in front of principal stores."

EDITORIAL NOTE.—For a discussion of Sidewalk Arcades for Traffic Relief, see article under that title by Arthur S. Tuttle, in THE AMERICAN CITY for January, 1925, pages 77-81. This article is illustrated with pictures of six foreign examples of arcaded sidewalks.

These Men Also Have Been City Engineers for Ten Years or More in One Ctiy



W. W. Southgate,
City Engineer of Nashville, Tenn., Since 1901



Louis C. Lawton,
City Engineer of Haverhill, Mass., Since 1912

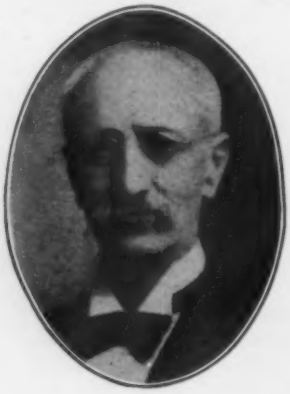
M. M. O'Shaughnessy,
City Engineer of San Francisco, Since 1912

M. J. Douthitt,
City Engineer, of Waukegan, Ill. Since 1911

Robert Hoffman,
City Engineer of Cleveland, O., Since 1907

M. J. Guyton,
City Engineer of Dublin, Ga., from 1907 to 1926

S. R. Alexander,
City Engineer of Clarksville, Tenn., Since 1904



Bert C. Gowen,
City Engineer of Wausau, Wis., Since 1909

Thomas Pealer,
City Engineer of Indiana, Pa., Since 1909

(Portraits of nine other city engineers who have occupied that position for ten years or more were published in the May number. Other similar photographs will be welcome for subsequent issues.)

Soil Temperatures and the Depth of Laying Water Pipes

By Scotland G. Highland

General Manager, Clarksburg Water Board, Clarksburg, W. Va.

A STUDY of year-round soil temperatures from zero to a depth of 6 feet below the surface of the ground will afford data of universal practical value in the field of water-supply. Accurate knowledge of frost penetration in city streets is readily seen to be of vital importance to a water department in determining the depth to which water-mains and service-lines should be buried, in order to avoid the damaging action of frost.

Year-Round Under-Soil Temperatures

Thermometers for ascertaining the year-round temperature of the subsoil at various depths were installed January 1, 1923, at Clarksburg, W. Va., Lat. 39.3 N., Long. 5 hrs. 21 min. W. Six separate thermometers are used, one being required for each foot of depth investigated, and are installed in an abandoned, unpaved roadway representative of traveled street conditions. These instruments consist each of a stout stem graduated and figured thermometer, enclosed in a wooden case, the upper front part of which is cut out, exposing the 11-inch scale, and ranging in depth from 1 to 6 feet. No shelter should be used for the thermometers.

The daily readings of these thermometers check surprisingly well with the records of frost penetration in all parts of the city as found by frequent necessary excavations in the streets during and following protracted cold weather. Another severe winter like that experienced in 1917-18, will supply data of lasting worth.

It seems advisable to include in this study a record of the lowest depth to which frost has penetrated in city streets in American and Canadian cities and towns; the current practice relating to the depth at which water-mains and service-lines are laid, and the resulting experience in freezing, based upon accurate data recently obtained by me from responsible water-works officials throughout the United States and Canada, covering experiences and practices of a 25-year period ending March, 1926.

Unless carrying water at high velocities, water pipes throughout the northern and northeastern United States and Canada should be laid well below the maximum frost line, which extends in some cases to the astonishingly low depth of 12 feet.

If laid at sufficient depth, water pipes will not freeze. It is not in the mains but in the services that most of the trouble from freezing occurs, due to the laying of services at depths considerably less than the mains. Water-mains in the "gridiron system" of the distribution lines, having a good circulation, seldom freeze, but dead-ends and shallow services in streets and under sidewalks and lawns, often privately laid and maintained, cause trouble.

A Valuable Study

The water-works fraternity is deeply indebted to Scotland G. Highland for this painstaking and thorough study of soil temperatures in Clarksburg, W. Va., and for the compilation of related data from other cities.

Water Purveyor's Responsibility

In order to insure the selection of suitable piping material, and to obtain a sufficient depth of cover, all service lines should be laid from the main in the street to the cellar or basement of the house or building, by the water purveyor. At no other point do the true interest and responsibility of the water utility end.

The patrons served ought to entrust to the care of experienced men the selection of service-pipe materials best suited to convey, over a long period of years, the particular water supplied, and to accept the judgment of practical water-works men as to the possible depth of frost penetration in city streets and under sidewalks and private lawns. The actual cost of the entire service line from the main to the cellar or basement is a proper charge against the property supplied.

This procedure with regard to the laying of services should at once put an end to one of

the greatest nuisances found in the operation of a water utility, and certainly provide a dependable year-round service to the water consumers for which they would feel deeply indebted.

There are other equally important reasons why water-mains and service-lines should be buried at extreme depths, which will be discussed presently.

Earth Temperature Warnings

With respect to the action of frost, the character of the soils, generally classified as gravel, sand, clay, loam, marl, peat, and muck, is a factor of importance in determining the economical depth at which water pipes should be laid; yet as previously shown, soil thermometers installed at a location typical of traveled roadways will give low temperature warnings throughout the confines of a city equipped with these instruments.

Experiences and practices recently described to me by water-works executives in a dozen selected cities follow:

Calgary, Alta.—In the winter of 1916 frost penetrated to a depth of 12 feet in gravel and 8 feet in loam.

Moose Jaw, Sask.—Frost penetration reaches lowest depth under roadways, where the soil is firmly compact. It is less in boulevards and on private property, where the soil is looser and often protected by grass. In these latter places the frost penetration is about 2 feet less than in the abutting streets. Frost penetration is greatest in wet clay soils, and 50 per cent less in sandy soils.

Ottawa, Ont.—Frost penetrates to depth of 6 feet where there is considerable traffic. Depth of snow important.

Montreal, Que.—Frost penetrates 5 feet, depending on nature of sub-soil.

Leadville, Colo.—Frost penetrates to depth of 9 feet. In March, 1926, it was down 8 feet. These conditions obtain where the gravel is loose; in clay formation it does not go so deep. Service-pipes in Leadville are laid in a double boxing from the main to the standpipe at the building. When the frost reaches the service-pipe, an upright boiler on wheels is employed to turn steam into the curb-box, which follows the service through the boxing provided to the main and thaws out the pipe quickly. Early snows that lie in the streets prevent serious freezing trouble.

Davenport, Ia.—Frost will penetrate deeper in one street than in another. It penetrates deeper on the south side of an east-and-west street than on the north side. Water-mains are laid on the north side.

Portland, Maine.—Much trouble during winters which have little snow.

Omaha, Nebr.—Depth of frost varies greatly with amount of snow on the ground; whether the street is paved or unpaved, and the amount of moisture in the soil.

Syracuse, N. Y.—Clay soils do not freeze as soon as sand and gravel.

New York City.—Particular care is taken to secure a good backfill in trenches excavated in loose material, or in rock, both to prevent freezing and unequal settlement. In paved streets there is but little frost penetration, and the freezing of services might occur only where these lie with shallow cover, near the cellar walls. During the winter of 1917-18, the frost under asphalt pavement on concrete reached a depth of 2½ feet and under other pavements 3½ feet.

Glens Falls, N. Y.—Where clay or heavy loam is encountered there are freeze-up troubles. Soil conditions are generally sandy. Services in rock trenches have never given trouble.

Clarksburg, W. Va.—Frost penetration in 1917-18 reached a depth of 3 feet. Mains and services are laid with 4-foot cover.

Bluefield, W. Va.—Services have frozen under paved streets at depth of 2½ feet.

As a general proposition, it is customary to lay water-pipes no deeper than is necessary to furnish adequate protection against frost action. However, there are other important reasons why pipes should be buried well below the lowest frost line.

Impact the Enemy

Undoubtedly, heavy motor trucks on rough paving develop impacts and vibrations which tend to displace cast-iron water-lines. Broken services and blown joints are often caused by impact of heavily laden trucks with unevenly worn solid tires, which administer terrific blows to the surface over which they travel at high speed. Impact is the new destructive enemy of pavements and underground water-lines. When a loaded motor truck, weighing, with its load, 22,500 pounds, and moving at a rate of 15 miles an hour, encounters an obstacle on the highway sufficient to give the wheels a drop of 1 inch, the effect upon the road is practically the same as though the total weight was multiplied several times. In a sense the truck becomes a projectile and batters the surface with mighty impacts, causing trouble to all underground piping. Smaller trucks act in a similar way, but with an impact or striking force in proportion to the weight, load, condition of tires, and obstacles encountered on the highway.

Depth Affects Contraction, Expansion and Electrolysis

At lower depths the ground temperature becomes more uniform, and a difference of one or two feet is appreciable in contraction and expansion of the pipes, and measurable in the water temperatures.

The deeper pipes are laid the less susceptible they are to electrolysis, but no authentic data are available to determine the magnitude of this difference.

It is undoubtedly true that if water pipes are laid at a minimum depth of 5 feet they will be below the depth at which other utilities, aside from sewers, explore in search of their subsurface equipment, often to the detriment of water-mains and lead services.

The soil at lower depths is ordinarily freer from impurities affecting the life of the pipe, especially where there has been a filling with cinders or other materials having a tendency to corrode the pipe.

Highest and Lowest Soil Temperatures

An accurate record of the highest and lowest soil temperatures and air temperatures at Clarksburg, West Virginia, from January 1, 1923, to April 30, 1926, follows:

HIGHEST AND LOWEST SOIL TEMPERATURES, CLARKSBURG, W. VA.

		Soil Temperatures						Air Temperatures		
		12″	24″	36″	48″	60″	72″	Max.	Min.	Mean
		For the Year 1923								
January	High	41	40	40	44	..	..	58	..	..
	Low	37	38	39	42	..	..	..	7	35
February	High	45	43	42	43	..	..	62	..	..
	Low	32	35	36	40	..	..	..	0	29
March	High	45	43	42	43	..	..	76	..	..
	Low	34	35	36	39	..	..	..	12	41
April	High	54	52	50	50	50	48	82	..	..
	Low	37	40	40	43	44	46	..	7	50
May	High	65	62	57	56	54	54	89	..	..
	Low	50	52	50	50	50	49	..	32	61
June	High	72	68	66	64	58	56	97	..	..
	Low	62	62	58	56	54	54	..	44	72
July	High	72	70	67	66	64	62	91	..	..
	Low	66	66	63	63	64	61	..	48	72
August	High	74	72	69	68	66	64	90	..	..
	Low	66	66	65	66	64	62	..	44	72
September	High	70	69	66	66	65	64	90	..	..
	Low	60	62	62	63	63	62	..	40	67
October	High	64	65	63	64	63	62	84	..	..
	Low	48	52	52	55	56	56	..	28	52
November	High	50	52	52	56	56	57	67	..	..
	Low	41	42	43	47	48	50	..	20	43
December	High	49	48	46	48	50	52	69	..	..
	Low	40	42	42	46	48	48	..	14	45
For Year	High	74	72	69	68	66	64	97	..	..
	Low	32	35	36	39	44	46	..	0	83
		For the Year 1924								
January	High	46	45	43	46	48	48	70	..	..
	Low	33	34	36	40	42	44	..	–3	34
February	High	37	38	36	40	41	43	70	..	..
	Low	34	34	34	36	40	42	..	9	33
March	High	45	43	40	42	42	42	80	..	..
	Low	34	34	34	38	40	41	..	16	42
April	High	52	50	47	48	48	47	79	..	..
	Low	39	40	40	42	42	42	..	21	52
May	High	58	56	52	53	52	52	87	..	..
	Low	49	50	48	48	48	47	..	34	58
June	High	69	68	64	62	60	58	92	..	..
	Low	55	55	53	54	54	52	..	42	71
July	High	70	68	65	64	63	61	94	..	..
	Low	66	66	63	62	60	58	..	47	72
August	High	70	70	67	66	64	63	96	..	..
	Low	66	67	65	64	63	61	..	49	74
September	High	70	69	68	66	65	64	92	..	..
	Low	60	62	61	62	62	62	..	38	64
October	High	61	62	61	62	61	61	82	..	..
	Low	50	52	51	55	57	57	..	25	56
November	High	51	52	58	57	58	57	76	..	..
	Low	41	42	45	50	51	52	..	13	43
December	High	48	44	44	50	51	52	70	..	..
	Low	35	38	39	43	46	48	..	1	35
For Year	High	70	70	68	66	65	64	96	..	..
	Low	33	34	34	36	40	41	..	–3	50
		For the Year 1925								
January	High	37	39	39	44	46	48	56	..	..
	Low	34	36	37	37	42	42	..	–8	30
February	High	43	42	40	42	42	44	71	..	..
	Low	36	36	36	39	40	42	..	6	38
March	High	48	46	44	45	45	45	78	..	..
	Low	36	37	37	40	42	43	..	3	44
April	High	59	57	53	52	51	50	95	..	..
	Low	42	42	42	44	44	45	..	27	52
May	High	60	60	56	56	55	54	89	..	..
	Low	50	52	50	52	51	50	..	31	57
June	High	70	68	65	64	62	60	100	..	..
	Low	61	59	56	56	55	54	..	47	73
July	High	74	72	68	67	65	64	98	..	..
	Low	68	67	64	64	62	60	..	46	74
August	High	71	70	67	67	66	65	96	..	..
	Low	66	66	66	66	64	63	..	46	72
September	High	71	70	65	68	67	64	101	..	..
	Low	65	66	65	66	63	62	..	48	72
October	High	65	66	65	66	65	64	80	..	..
	Low	47	50	52	56	57	58	..	19	50
November	High	50	50	51	55	57	58	72	..	..
	Low	41	43	45	49	50	51	..	20	41
December	High	43	45	45	49	50	51	67	..	..
	Low	33	37	38	43	45	47	..	0	32
For Year	High	74	72	68	68	67	65	101	..	..
	Low	33	36	37	37	40	42	..	–8	53
		For the Months January–April (Inclusive), 1926								
January	High	36	39	42	44	45	48	63	..	..
	Low	32	34	36	40	41	42	..	–13	26
February	High	40	38	38	40	41	43	65	..	..
	Low	33	35	35	39	39	41	..	9	33
March	High	42	43	40	42	42	43	65	..	..
	Low	34	35	36	39	39	40	..	5	34
April	High	50	48	46	47	47	46	78	..	..
	Low	39	36	39	40	42	41	..	19	45

Current Practices in U. S. and Canada

Record of frost penetration experiences covering a period of 25 years, and current practices relating to depth at which water-mains and services are now (1926) laid in various parts of the United States and Canada:

State or Province and City	Lowest Depth of Frost Penetration in City Streets, in Feet, During the Last 25 Years, Ending March, 1926	Depth to Which Mains and Services Are Now (1926) Laid in City Streets, in Feet
Alberta, Can.		
Calgary	12 ft.	8 ft. in loam, 10 ft. in gravel
Edmonton	6½ ft.	8½ ft. trench for mains; 7 ft. trench for services
Saskatchewan, Can.		
Moose Jaw	9 ft.	9 ft. cover
Regina		7½ ft. cover
Ontario, Can.		
Brantford		5½ ft. cover
Chatham	3 ft.	4 ft. cover
Ottawa	6 ft.	6½ ft. cover
Windsor		5 ft. cover
Quebec, Can.		
Montreal	5 ft.	6 ft. trench
Manitoba, Can.		
Winnipeg	7 ft.	7½ ft. cover
Arkansas		
Little Rock		2½ ft. trench
California		
Sacramento		2 ft. cover
Colorado		
Leadville	9 ft.	7 ft. cover
Denver		4½ ft. cover
Colorado Springs		4½ ft. cover
Connecticut		
Hartford	6 ft.	4 ft. cover
Meriden		4 ft. cover
Delaware		
Wilmington		3 ft, 8 in. cover
Florida		
Tallahassee		3 ft. trench
Georgia		
Atlanta		Mains 2½ ft. cover; services 2 ft. cover
Idaho		
Boise		4 ft. cover
Illinois		
Danville	4 ft.	5 ft. trench
Quincy	3 ft.	Mains, 4½ ft. cover, services 3½ ft. cover
Chicago		5½ ft. cover
Bloomington		3½ to 5 ft. trench
Indiana		
Richmond	5 ft.	Mains 5 ft. cover; services 4½ ft. cover
Logansport	6 ft.	Mains 5 ft. cover; services 3½ ft. cover
Gary	5 ft.	5½ ft. cover
Terre Haute	4 ft. 7 in.	4½ ft. cover
Fort Wayne		5½ ft. trench
Elkhart		5 ft. cover
Lafayette		4½ ft. cover

State or Province and City	Lowest Depth of Frost Penetration in City Streets, in Feet, During the Last 25 Years, Ending March, 1926	Depth to Which Mains and Services Are Now (1926) Laid in City Streets, in Feet
Iowa		
Fort Dodge	7 ft.	5½ ft. cover
Dubuque	6 ft.	6 ft. cover
Des Moines	5½ ft.	6 ft. trench
Council Bluffs	5 ft.	5 ft. cover
Burlington	5 ft.	5 ft. cover
Davenport		6 ft. cover
Cedar Rapids		5½ ft. cover
Kansas		
Kansas City		4 ft. cover
Kentucky		
Louisville		3 to 3½ ft. cover
Frankfort		3 ft. cover
Louisiana		
Baton Rouge		2½ ft. cover
Maine		
Portland	5 ft.	5 ft. cover
Biddeford		5½ ft. cover
Augusta		5 to 5½ ft. cover
Maryland		
Hagerstown	2 ft. 8 in.	3 ft. cover
Baltimore		Mains 3½ to 4 ft. cover; services 3½ ft. cover
Massachusetts		
North Attleboro	7 ft.	
Fitchburg	7 ft.	6 ft. cover
Springfield	5 ft. 10 in.	6 to 7 ft. trench
Melrose		6 ft. cover
Haverhill		5 to 5½ ft. cover
Lynn		5 ft. cover
Brockton		5 ft. cover
Fall River		5 ft. cover
Beverly		5 ft. cover
Holyoke		Mains 4½ ft., services 5 ft.
Gloucester		4½ ft. cover
Lowell		4 to 5 ft. cover
Michigan		
Battle Creek	6 ft.	Mains 5 ft. cover; services 5½ ft. cover
Flint	5 ft.	5 ft. cover
Detroit	5½ ft.	Mains 5 to 6 ft. cover; services 5 ft. cover
Minnesota		
St. Paul	11 ft.	8 ft. trench
Duluth	9 ft.	Mains 6½ to 7½ ft. cover; services 7½ ft. cover
Minneapolis		Mains 8 ft. to axis of pipe; services 9 ft. cover
Mississippi		
Jackson	6 in.	2 ft. cover
Missouri		
Kansas City	2½ ft.	4 ft. cover
Montana		
Great Falls		Mains 3½ to 12 ft., services 5 ft.
Butte		6½ ft. cover
Helena		5½ ft. cover
Nebraska		
Omaha		5 ½ ft. cover
New Jersey		
Paterson	3½ ft.	4½ ft. cover
Jersey City		4½ ft. cover
Trenton		4 ft. cover
Elizabeth		3½ ft. cover
Camden		3½ ft. cover
New Mexico		
Santa Fe	3 ft.	3 ft. cover
New York		
Buffalo	6 ft.	5 ft. cover
Elmira	4½ ft.	5½ ft. trench
Syracuse	4 ft.	4½ ft. cover
New York City	2½ ft.	4 ft. cover
Ogdensburg		Mains 6 ft. trench; services 5½ ft. trench
Albany		5 ft. cover
Glens Falls		5 to 6 ft. cover
Gloversville		4½ to 6 ft. cover
Rochester		4½ ft. cover
North Carolina		
Raleigh	1 ft. 3 in.	Mains 2½ ft. trench; services 2 ft. trench
North Dakota		
Bismarck		7 ft. cover
Ohio		
Akron	6 ft.	5 ft. cover
Toledo	4½ ft.	4 ft. cover
Cincinnati	3 ft.	3½ ft. cover
Cleveland		6 ft. cover
Lima		Mains 4 ft. cover; services 3½ ft. cover
Columbus		3½ ft. cover
Pennsylvania		
Hazleton	7½ ft.	Mains 5½ ft. cover; services 5 ft. cover
Erie		6 ft. cover
Altoona		Mains 4½ ft. cover; services 3½ ft. cover
Pittsburgh		4 ft. cover
Allentown		4 ft. cover
Chester		4 ft. cover
Harrisburg		3½ ft. cover
Johnstown		3 ft. cover
York		3 ft. cover
Rhode Island		
Woonsocket	7 ft.	6 ft. cover
Providence		Mains 4 ft. 8 in. to center of pipe; services 4 ft. 6 in.
Utah		
Salt Lake City	3 ft.	4 ft. cover
Vermont		
Montpelier		5½ ft. cover
Virginia		
Richmond		Mains 4 ft. cover; services 2½ ft.
Washington		
Spokane	5½ ft.	4½ ft. cover
Everett	1½ ft.	2½ ft. cover
Seattle		Mains 4 ft.; services 2 ft.
West Virginia		
Wellsburg		4½ ft. cover
Wheeling	3 ft.	3 ft cover
Clarksburg	3 ft.	4 ft. cover
Bluefield	2½ ft.	2½ ft. cover
		4 ft. cover for mains; services 2½ ft. cover
Parkersburg		3 to 6 ft. cover
Charleston		3 ft. cover
New Martinsville		3 ft. cover
Wisconsin		
Madison	6½ ft.	6 ft. cover
Fond du Lac		Mains 6 to 7 ft. cover; services 5½ to 6½ ft. cover
Milwaukee		6 ft. cover
Kenosha		5½ ft. cover
Wyoming		
Cheyenne		5 ft. cover

COST OF INSTRUMENTS

Thermometer No.	Inches Deep Below Surface	Price
304	12	$8.00
305	24	9.50
306	36	11.50
307	48	13.50
308	60	15.50
309	72	17.50
310	84	19.50
311	96	22.00

Conclusion

The study of year-round soil temperatures below depths at which pipes are now laid has been an interesting object of research from the fact that it reveals dependable data, long sought for by the water-works fraternity, and assuredly offers great promise in numerous ways to diligent investigators in the vast domain of water-supply.

ACKNOWLEDGMENT.—From a paper presented before the 46th Annual Convention of the American Water Works Association.

Forward Steps

Reported by Municipal Officials, Chamber of Commerce Executives and Others

Boston's New Fire-Alarm Headquarters

BOSTON, MASS.—As it was in Boston, some 74 years ago, that the first fire-alarm station in the world was installed, it is most fitting that Boston should now have what is believed to be the finest fire-alarm central office in the world.

The original system was invented by Dr. William F. Channing, who was assisted in its development and construction by Moses G. Farmer, one of the foremost electrical engineers of the day and later the first superintendent of fire-alarm telegraph. The system then consisted of three box circuits, three bell circuits, forty boxes, sixteen alarm bells, and crude central office apparatus housed in a building which was exposed to serious fire hazards.

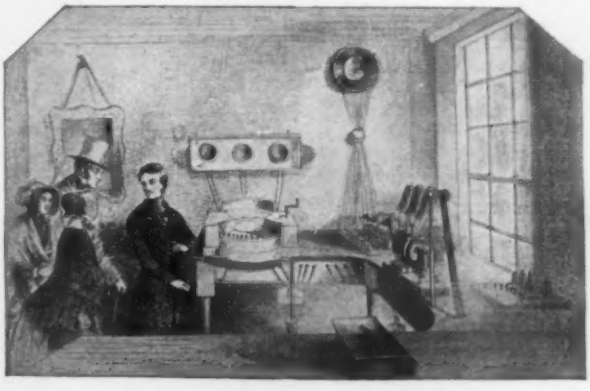
The new office, equipped with Gamewell apparatus, is housed in a beautiful building and presents a decided contrast to the old system. It is located in the Fenway, a part of Boston's Park System, 250 feet away from the nearest building, and nothing will ever be built nearer. The building is of fire-resistant construction and of sufficient size to take care of the city's natural growth and the possible annexation of surrounding cities and towns. It is located as near the central point of the present cable system as possible. A special act of the Legislature was passed giving the city the right to use a section of the park system for this purpose.

There are at present in service in Boston some 1,360 fire-alarm boxes connected to 73 box circuits; 18 tapper circuits and 16 gong circuits. Three signal circuits are connected with the high-pressure pumping system, two of which connect all the boxes in the high-pressure districts. The central office boards which are installed have a capacity of 2,000 boxes, and space has been provided so that additional boards may be erected, giving an ultimate capacity of 5,000 boxes. Each alarm that is received is recorded on one of the 25 four-circuit shearing registers, and the exact time of its receipt is automatically stamped on the register paper. Three four-dial, four-number transmitters are provided for sending the alarms to the engine-houses. Two separate circuits run from headquarters to each apparatus house in the city. One of these circuits operates the light, quick-acting bells on the desk in each apparatus house, and the second circuit operates the loud-sounding gongs in the houses. Registers are provided that record the number and the time that each alarm is sent, thus checking the receipt and transmission of alarms.

Telegraphic communication can be held over the lines running to the boxes on the street for testing purposes, and over the gong lines running to the apparatus houses for the transmission of routine or special orders. Boston has the distinction of having the only registers at headquarters which will make a permanent record of telegraphic signals by shearing the signals in paper tape.

Electrical energy for the system is provided by some 6,500 calls for storage battery. Each circuit has duplicate sets of battery, and while one is on the working line the second set is being charged.

Boston for a number of years operated the fire-alarm system from dynamotors, but when the new office was engineered the standard practice of using duplicate sets of storage batteries was adopted to assure less chance of interruption of service. In addition to two outside sources of supply, a gasoline-driven generator is provided so



BOSTON FIRE-ALARM HEADQUARTERS, 1852
Reproduction of view of the original installation published in a Boston paper shortly after the system was placed in operation

BOSTON'S NEW FIRE-ALARM HEADQUARTERS

INTERIOR, BOSTON'S NEW FIRE-ALARM HEADQUARTERS

that an unfailing source of current is assured.

Plans are being made for the reception of signals from the adjacent cities and towns so that provisions can be made for mutual aid. A map is maintained which shows the location of each fire-station, and tags are provided for each company. When the companies are shifted, the tags are moved, so that it is possible to tell at a glance the location of any company.

J. J. RYAN.

Better Traffic Facilities Through Chamber's Efforts

PORTSMOUTH, OHIO.—Particular attention is being paid by the Portsmouth Chamber of Commerce to the improving of transportation facilities in this community and its surroundings, and considerable progress has already been made.

One outcome of our efforts is the construction of a bridge over the Ohio River, opening up a new traffic artery from the interior of the state of Kentucky through the commercial center of the city of Portsmouth. This bridge is now under construction, and when completed will, we believe, be of more general good to the community than any other transportation project of the present time.

The Atlantic-Pacific highway, which passes through Portsmouth, is now being paved in the outlying sections of the city; likewise, other highways leading to our adjacent counties are being hard-surfaced, widened, and improved, so that they may more adequately meet the traffic originating along these routes. These highways are all properly marked with route numbers, danger signs, etc.

Within the city, Second Street has been much improved through resurfacing with sheet asphalt and the relaying of its double car line. Chillicothe Street has been widened, and also repaved with sheet asphalt, so as to afford easier travel through the retail shopping section and banking district.

Among the problems that now confront us are the widening of other streets in the narrow sections of the city; also the highways leading through the two counties lying between Portsmouth and Ironton, making these capable of accommodating the increasing motor traffic which must find an outlet through the valley over this particular route. This will embrace the removal of an old covered bridge over the Little Scioto River and the substitution of a modern concrete structure. This will probably be completed within the year, being now under construction.

In this country, the Commissioners work in close harmony with the Department of State Highways to promote the elimination of grade crossings and to secure state maintenance for as much highway construction as possible. Much has been achieved through their combined efforts.

ADAM FRICK,
Manager, Chamber of Commerce.

Referendum Results in Change from Free to Pay Camp

EAU CLAIRE, WIS.—In a referendum issued early this year by the Eau Claire Civic and Commerce Association, a decided majority of the members of the organization expressed themselves in favor of establishing a fee for the use of the local tourist camp, believing that this step is warranted by the present facilities of the camp; that the so-called tramp tourists who take advantage of the camp for weeks at a time are not worth this free service; and that a pay camp would invite a higher class of tourists. A charge of 25 cents per twenty-four hours per car has since been set by action of the City Council.

As made clear in a statement issued with the referendum, no material improvements will be made in the camp this year. It now provides kitchen facilities for cooking, lights, water, wood for camp fires, toilet facilities, and several concrete platforms for tents. A watchman, specially deputized as a policeman, is on the job from 8 in the morning until 10 at night.

If any profits are made from the camp under the present system, the City Council has agreed that the funds will be put into improvements such as shower-baths, pavilions, etc.

ART O. HEDQUIST,
Secretary, Civic and Commerce Association.

How Muncie Financed Its New City Hall

MUNCIE, IND.—A new $200,000 City Hall was completed a short time ago in Muncie, to take the place of the city building erected almost fifty years ago, which had long since outlived its usefulness.

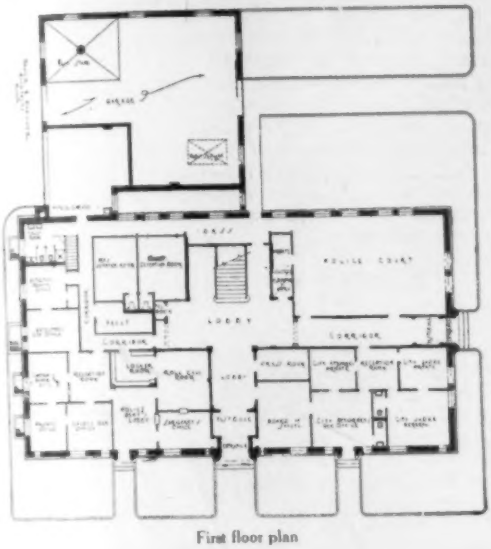
The new structure stands on the site of the old City Hall, in the heart of the downtown business section, less than three blocks from the Court House, and opposite the Public Library. At the rear of the main building shown in the accompanying photograph, a municipal garage of fine architectural design has been erected. This is approached by a cement driveway with landscaped lawns on either side. Lawns and shrubbery have been laid out around the entire structure.

All the departments of the city government, which for the last five years have been scattered in office buildings about the town, are now enjoying the advantages of coordination under one roof in adequate quarters arranged according to the floor plans here shown.

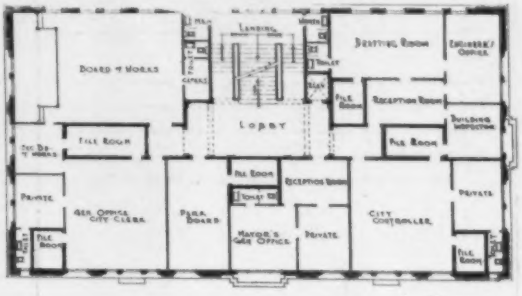
The total cost of the building was approximately $185,000, of which $15,800 was expended for equipment and furnishings. It was financed through the issuance of bonds in the sum of $175,-

000 and the appropriation of an additional $10,000 from the city's general fund. The actual retirement of these bonds was started even before the building was ready for occupancy. An extra two-cent levy made for the benefit of the sinking fund three years prior to the completion of the new City Hall, created a surplus of $50,000, and this was credited to the building fund in July, 1925. The balance will be paid off in five annual installments of $25,000 each.

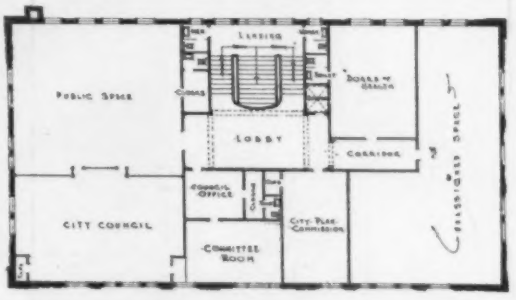
From the fact that the city's present outstanding indebtedness, including the City Hall bonds, is less than $500,000, as compared with its bonding capacity of more than $1,200,000, it may be seen that Muncie is in a healthy financial condition. Largely through the efforts of the Tax Committee of the local Chamber of Commerce,



First floor plan



Second floor plan



Third floor plan

Courtesy of Nation-Robinson Company, Printers, Muncie

NEW CITY HALL, MUNCIE, IND.

Form No. F. 1

BUILDING INSPECTION

DEPARTMENT OF PUBLIC SAFETY
DIVISION OF FIRE
KALAMAZOO, MICHIGAN

City.....
Name of Building.....
Street and Number.....
Name of Owner.....
Inspector.....
Date of Inspection.....

You are hereby directed to make the following changes in your building:

DEPARTMENT OF PUBLIC SAFETY
DIVISION OF FIRE

.....
Chief.

ORDINANCE NO. 60.

CHAPTER XIX of Ordinance Number 1, known as the Police and License Code of the City of Kalamazoo, is hereby amended by adding two new sections thereto, to be known as Section 11 and Section 12.

The City of Kalamazoo Ordains:

Section 1: Chapter XIX. of Ordinance Number 1, known as the Police and License Code, of the City of Kalamazoo, is hereby amended by adding two new sections thereto, to be known as Sections 11 and 12, as follows:

Section 11: It shall be the duty of the Chief of the Fire Department to examine carefully, or cause the same to be examined carefully, and at all times during the year, every hall, store, factory, theatre or public building or premises where ashes or inflammable materials are kept and deposited, and when said Chief of Fire Department or his duly authorized representative shall deem any building, chimney, stove, stove-pipe, hearth, oven, boiler, ash-house, or place where ashes or other inflammable materials are kept in any such buildings or place, unsafe, or shall discover within his district any cause or condition from which immediate danger of fire may be apprehended, he may either remove or abate the same, in case of neglect or refusal of the owner, the agent, occupant, lessee or person in charge thereof, after being directed to do so, or he may serve written notice upon such owner, agent, occupant, lessee or person in charge thereof, directing such measures as will render the same more safe against fire, and the owner, agent, occupant, lessee, or person in charge thereof, shall comply with such order of the Chief of Fire Department within the time fixed by him; provided, however, that such owner, occupant, agent, lessee or person in charge of such building, shall be entitled to appeal from such order to a Board consisting of the Director of Public Safety, and the Chief of the Fire Department and the Building Inspector, whose decision shall constitute the final order to be complied with.

Section 12: Any person violating any provision of any of Section 11 of this ordinance shall be deemed guilty of misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding fifty ($50.00) dollars and be further fined in the sum of three ($3.00) dollars for every day said violation shall continue, not to exceed a total of one hundred ($100.00) dollars, or imprisonment in the County Jail of Kalamazoo County for a period of not more than ninety (90) days, or by both fine and imprisonment, in the discretion of the Court. In addition to the above fine in case of fire resulting directly from any omission or neglect to properly comply with the written order of the Chief of the Fire Department as provided in the next preceding section, the person or persons culpable or negligent in respect thereto shall be liable in a civil action for the payment of all costs and expenses of the Fire Department incurred in and about the use of employees, apparatus, and materials in the extinguishment of any fire resulting from such cause, the amount of such costs and expenses to be fixed by the Director of Public Safety and when collected to be paid into the general fund of the City of Kalamazoo.

Section 2: All Ordinances or parts of ordinances inconsistent with or contrary to the provisions of this ordinance are hereby repealed.

The foregoing ordinance was adopted by the City Commission of the City of Kalamazoo, April 26th, 1926, and approved by Mayor George K. Taylor on the same date.

GEORGE K. TAYLOR,
Mayor

E. A. VICKERY,
City Clerk

TWO SIDES OF THE NOTIFICATION FORM TO BUILDING OWNERS USED BY THE KALAMAZOO FIRE DEPARTMENT

the low tax rate of $2.58 has been reached. A very keen interst in municipal and county affairs on the part of the Chamber of Commerce is encouraged by close cooperation between this body and official governing groups.

RICHARD G. BROPHY,
Secretary-Manager, Muncie Chamber of Commerce.

Penalty for Disregard of Fire Prevention Orders

KALAMAZOO, MICH.—The city of Kalamazoo is very proud of its new fire prevention ordinance. This not only levies a fine against the owner of a building failing to comply with fire precaution orders issued by the fire chief, but renders the owner personally liable for the cost of extinguishing fires resulting directly from such neglect. The complete text of the ordinance will be found in the accompanying reproduction.

Since this penalty for neglect has been prescribed, immediate action has almost invariably followed our orders for repairs, etc., issued subsequent to the inspection of buildings. Inflammable materials are promptly removed and the premises put in order, and in some cases where defective chimneys have been ordered repaired, the owners have voluntarily constructed entire new stacks. These are the results that we had hoped for. We have sought not to prosecute, but to prevent fires through the willing maintenance of clean and orderly premises.

A large share of our past fire loss has been due to the neglect of owners or occupants, and it has always seemed most unfair that this carelessness of a few should throw the burden of high fire insurance rates on the whole community. The passage of the new ordinance will, we feel sure, show a marked decrease in the number of preventable fires in this city.

C. H. RUSSELL,
Fire Chief.

Plan to Reduce Personnel Problems

NORFOLK, VA.—A municipal employee efficiency-rating system, conducted by a Personnel Bureau established for that purpose, has been inaugurated this year in Norfolk. This step is the outcome of the evident necessity for raising the standard of morale existing in the rank and file of the city's employees, some of whom felt that they were among the favored few, while others believed they were hopelessly in a rut. The atmosphere pervading was not conducive to an efficient administration of city affairs.

While the plan evolved has not been operating in Norfolk for a length of time sufficient to show potential results, an outline of the system may offer some helpful ideas to other municipalities where some such innovation would seem advisable.

In order that the newly established Personnel Bureau might have suitable records of all those on the city's payroll, each employee was required to fill out a questionnaire, including such details as his age, length of service, salary, etc. Information of this kind, covering all the forces, had never before been segregated and made available in a clear and concise form. It was something of a revelation, on analyzing the data received through the questionnaire, to find that so large a number of employees were beyond the age for efficient service; also to see the lack of standardization of rates of pay in the various departments.

EMPLOYE'S SERVICE RECORD
CITY OF NORFOLK

Name_____

Address_____ Phone No._____

Date Appointed_____ Position_____ Rate of Pay_____

Department of_____ Bureau of_____ Division of_____

Date	Change in Status	Salary	Discipline and Commendations

EFFICIENCY RECORD

	Interest in Work		Application		Ability to Learn		Confidence		Accuracy		Speed		Reliability		Initiative		Judgment		Conduct		Politeness		Personality		REMARKS
Year	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	

UPPER PORTIONS OF EMPLOYE'S SERVICE AND EFFICIENCY RECORD FORMS, NORFOLK, VA.

An efficiency-rating form was then drawn up, to be filled in by the heads of departments semi-annually and filed with the Personnel Bureau. These reports indicate on a percentage basis the relative efficiency of each employee in the following respects: interest in work, application, ability to learn, confidence, accuracy, speed, reliability, initiative, judgment, conduct, politeness, and personality. Any rating denoting either exceptionally fine service (above 90 per cent) or unsatisfactory service (below 60 per cent) must be accompanied by a written statement from the rating officer giving the reasons for such rating. In the case of an unsatisfactory rating, reasons sufficient to justify the dismissal of the employee must be reported. The importance of care in recording the efficiency of employees is of course emphasized, since an unfair or inaccurate report will lead to unjust treatment of the worker. Ratings must be made without fear or favor.

This rating system applies to all employees of the city other than officers elected by the people or appointed by the Council, judges of courts, the Director of Public Works, the Director of Public Safety, and the Director of Public Welfare. Per diem employees, with the exception of members of the Police and Fire Departments, will not be assigned rating marks.

It is expected that the most beneficial reaction to this system will be the development of an esprit de corps through the realization by employees that their good work and intelligent efforts are being watched and charted, while, on the other hand, they are penalized for errors of omission or commission.

It is not desired to give the impression that this is a complete system which, if put into effect in other municipalities, would serve as a panacea for all personnel difficulties; but it is felt that a plan along this line, with modifications to suit local conditions, would certainly have no deleterious effect within the ranks of employees in any municipality.

I. WALKE TRUXTUN,
City Manager.

"Modified Platoon" Traffic System Attracts Motorists Away from Congested Thoroughfares

DETROIT, MICH.—The accompanying map of Detroit's "loop" district shows the intersections controlled by automatic traffic signals and, in addition, the direction of traffic on one-way streets bordering the loop. The letters R and G indicate the colors, red and green, of the lights at one portion of the cycle on the streets surrounding the loop. Traffic signals at intersections within the loop are staggered in the same manner as the intersection shown, but, to avoid confusion, the colors of the signals are not shown on the map.

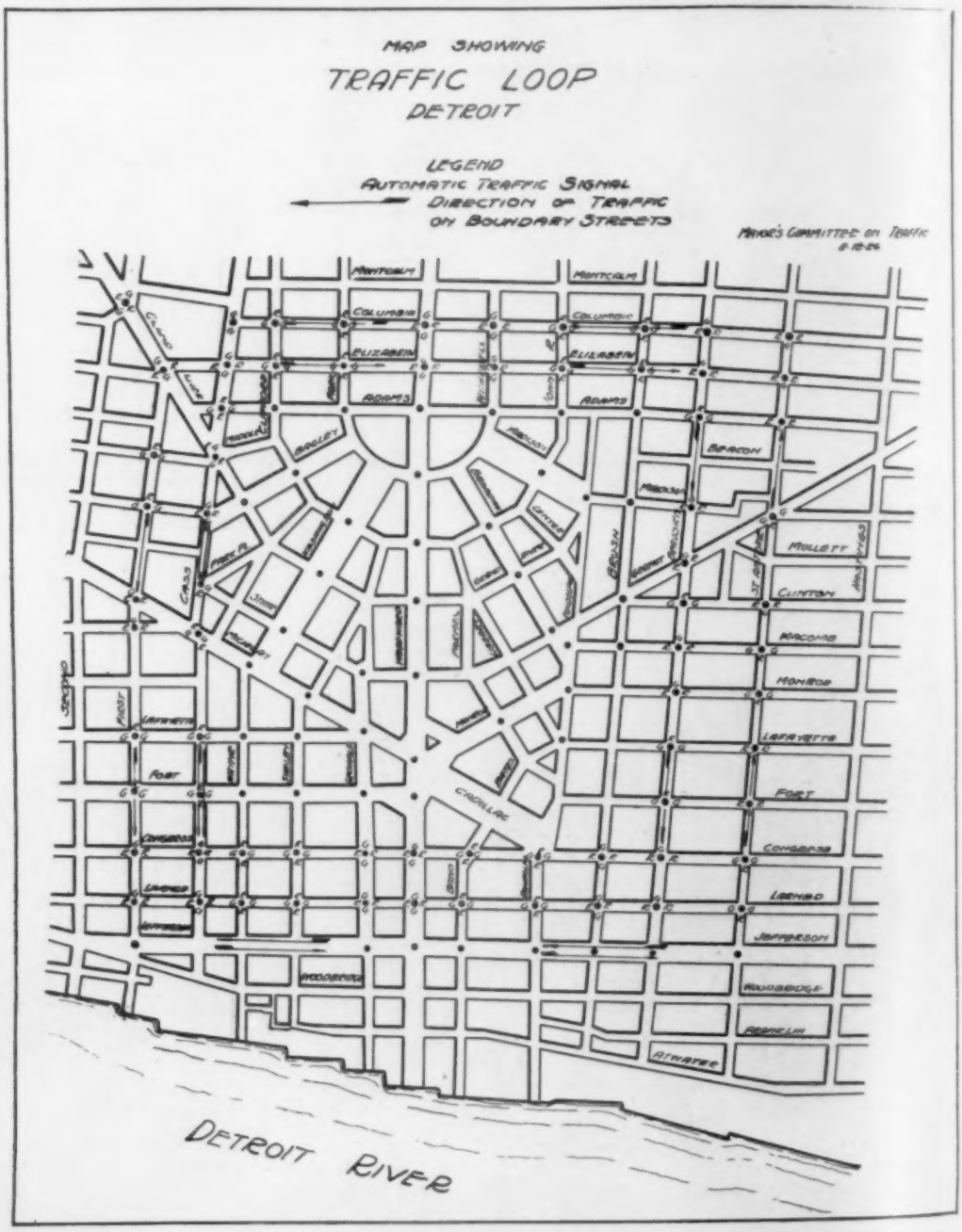
All intersections shown on this map are controlled on the same cycle by a single timing mechanism. The cycle is varied at different periods of the day to conform to the speed which traffic is able to maintain at these hours, so as to maintain as nearly as possible a non-stop movement of traffic. With the different timings used and the arrangements of lights as shown here, a range of speed of from 10 to 20 miles per hour is possible on different streets. On car-line streets the signals are timed for approximately a 10-mile movement, thus slowing down motor traffic to the speed maintained by the street car. On the loop streets proper, with all free wheel traffic, the speed maintained is about 20 miles per hour. Use of these different speeds on different classes of streets attracts motorists to the higher-speed streets and

away from congested thoroughfares, with beneficial results to the mass transportation system. The cycle in use at present is as follows:

7:00—8:00 A. M.—60 seconds
8:00—9:00 A. M.—64 seconds
9:00 A. M.—4:00 P. M.—60 seconds
4:00 P. M.—6:00 P. M.—72 seconds
6:00 P. M.—12:00 Midnight—60 seconds

During periods when pavement conditions are hazardous, the cycle is increased to 72 seconds to allow for a slower movement. The cycle is proportioned evenly, half for east and west movements and half for north and south movements. While this arrangement is not one hundred per cent efficient, it is the best possible solution for a large number of intersections controlled by one timing mechanism. It does penalize traffic on the main thoroughfare while giving an unduly long interval to minor cross streets, but the effect is unavoidable in the use of such a system.

Street-car movements have been expedited by this timing arrangement and motor traffic in general maintains a higher average velocity, although moving at a lower running velocity, due to the fact that fewer stops are required under this system. The actual average speed under all condi-



tions of motor traffic around the loop on the boundary streets is 16½ miles per hour, with a maximum speed at no time exceeding 20 miles per hour. Congestion within the loop has been decreased, as a great number of vehicles are now diverted around the loop where formerly they passed through the loop.

The traffic signal lights were installed and are operated by Superintendent William L. Potts, in charge of the Signal Bureau of the Detroit Police Department.

HAWLEY S. SIMPSON, Traffic Engineer.

Jaywalker Abolished; Traffic Facilitated; Pay-as-You-Violate Traffic Bureau Established

COLUMBUS, OHIO.—Obedience, both by motorists and pedestrians, to traffic signals in Columbus has been greatly aided by an intensive campaign of education through the newspapers, reinforced by efficient work on the part of the local Police Department. When the signals were first installed, officers were stationed at the main intersections and instructed to stop all persons disobeying the signals. Later, jaywalkers were not only stopped, but were given cards requesting obedience. Then it was announced in the newspapers that after a certain date pedestrians disobeying the signals would be arrested. This rule was enforced, as a result of which the people of Columbus have learned to have the proper respect for traffic regulations.

As shown by the accompanying illustration, the signals used in Columbus are of the four-way, three-light type, suspended above the center of street intersections. The signals are of Crouse-Hinds manufacture. We purposely took this picture at a time when there were practically no automobiles traveling east and west, to show that it does not take a blockade to stop the people from crossing against the lights.

FACILITATING TRAFFIC BY ALTERNATING LIGHTS

When the first fifty-eight lights were installed in the downtown section, all lights in the same direction appeared the same color at the same time. The system was then changed, whereby only two lights in the same direction were the same color at the same time; in other words, two consecutive green lights were followed by two consecutive red lights. A thorough study, however, has resulted in another change whereby every other light flashes the same color at the same time. This change is designed to speed up traffic so that an autoist, traveling at the legal rate of 15 miles an hour, may go practically the full length of the street without being stopped by lights. Pedestrians' waiting time at street intersections is reduced nearly 50 per cent, also. The former time-space allowed 40 seconds each for the red and green lights. Under the new change, which went into effect on July 8, the red and green lights show for 21 seconds each with an amber flash between of 1½ seconds as a caution signal.

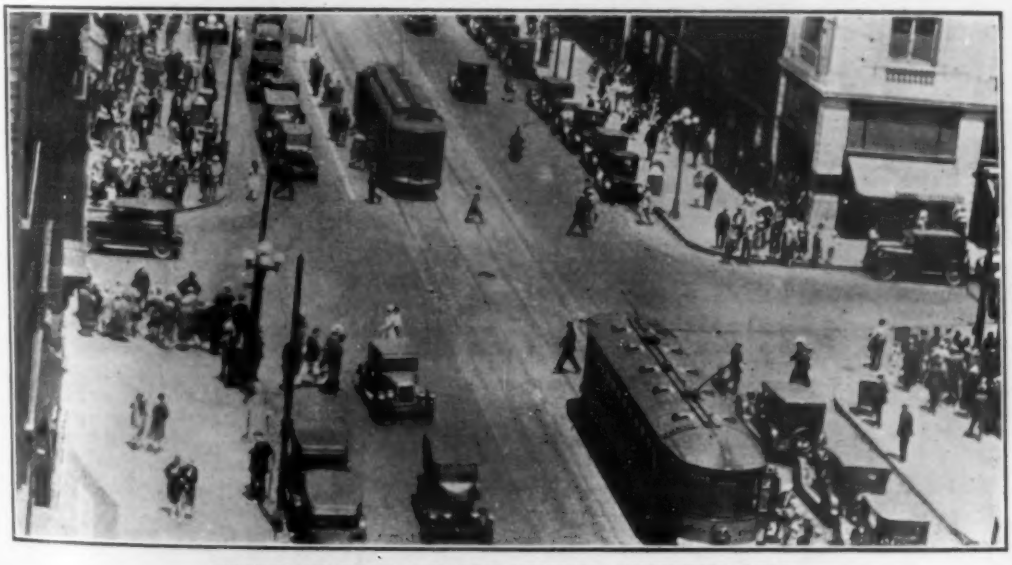
TRAFFIC BUREAU ESTABLISHED

On August 4 there was opened in the Clerk's office at the City Prison a Pay-As-You-Violate Traffic Bureau. Motorists who violate the traffic code now know in advance what their offense is going to cost if they are caught. Fines on eighty-three different traffic violations have been fixed. They range from $1 to $50, and drivers who wish to avoid the loss of time resulting from a court trial can plead guilty and pay the fine immediately. Fines for the varying offenses are:

Parking without tail light or riding a bicycle on a sidewalk, $1 for first offense, $2 for second offense, and $3 for third offense

Violating parking rules, $3 for first offense, $5 for second offense, and $10 for third

Failing to slow down for corners, ignoring main thoroughfares, failing to heed fire or police sirens, failing to stop for stationary street cars, driving wrong way on one-way streets, violating traffic lights, driving with open muffler and driving across fire hose, $10 for first offense, $15 for second and $25 for third



CORNER OF HIGH AND GAY STREETS, COLUMBUS, OHIO
Showing four-way traffic signals suspended above the center of the intersection

WARNING

You have violated the Traffic Code. Do not cross street except when the Light is GREEN, which means "GO."

—To Avoid Arrest—

Cross streets ONLY at intersections.

OBEY Traffic Signals whether walking or driving.

Follow these suggestions and AVOID ARREST.

FOR YOUR OWN SAFETY and the safety of others, help us enforce all regulations.

TRAFFIC DIVISION
Columbus Police Department

WARNING CARD HANDED TO JAYWALKERS AND THOSE VIOLATING TRAFFIC SIGNALS, COLUMBUS, OHIO

TRAFFIC BRANCH.
Municipal Court of Columbus, Ohio.
VIOLATION NOTIFICATION.

Case No.....

Date ..... Time ..... A. M. / P. M.

License No.....

Name .....

Address .....

You have violated the Traffic Code of the City of Columbus, Ohio, as indicated:

Section..... Paragraph.....

Location of violation.....

You are ordered to report at THE TRAFFIC BRANCH of the Municipal Court, located at Police Headquarters, No. 513 Sullivant Avenue, within 48 hours, after above date. FAILURE TO REPORT will result in Warrant of Arrest being issued.

Officer..... Shield No.....

Assignment or Post No.....
(Present this NOTIFICATION when you report)

WAIVER AND PLEA

I, the undersigned, hereby authorize and direct the Clerk of the Municipal Court of Columbus, Ohio, or his Deputy to enter a plea of guilty for me to the charge set forth in the affidavit, waive a jury trial, and voluntarily pay the penalty prescribed by the Court for this offense as designated on the back of this violation notification.

Name .....

Address .....

City..... State.....

NOTE: It is discretionary with you whether you settle the matter at THE TRAFFIC BRANCH or demand a hearing before the Court. In either case you must report within the specified 48 hours after above date.

The Office of THE TRAFFIC BRANCH is open daily from 8:30 A. M. to 5:00 P. M. (except Sunday and legal holidays)

TRAFFIC VIOLATION TICKET, COLUMBUS

The reverse side of the ticket lists the rate of fine for various offenses, and gives references to the sections of the traffic code covering such violations

Passing street cars to the left and for throwing missiles at automobiles or their drivers, $50

Driving with insufficient brakes, $15, $20, and $25

Violating automobile-light ordinances, $5, $10, and $15

Hitching horses to electric-light poles, fire hydrants or police or fire-box standards, or leaving horses unhitched, $5, $10, and $15

The Traffic Bureau in actual operation is proving very satisfactory.

J. T. DANIELS,
General Secretary, Columbus Chamber of Commerce.

"Building a County wide Program of Development," is the title of an article on pages 531-533 of this issue.

Artistic Entrance Signs

WEST PALM BEACH, FLA.—Entrance signs, one of which is here shown, have been erected at the four entrances to our city. These are lighted at night by electric reflectors. The signs clear the road by 15 feet and the width of the top is 7 feet. The total erected cost is $325 apiece.

C. A. BINGHAM, City Manager.

Library Service in Hospitals

PROVIDENCE, R. I.—The Providence Public Library has extended its service to a new field. It maintains a bedside library service in two of the city's large hospitals, the Rhode Island, and the Homeopathic.

This new type of library service was started on the theory that hospitals must look after the mental health of a patient during convalescence, and that wholesome books do more than almost any other thing to keep him happy and help him get well. By means of book carts or trucks which look like overgrown tea-wagons, reading matter, including books and magazines in English, as well as in foreign languages, are carried to the bedside of a patient.

From ward to ward and from room to room the book cart travels until every convalescent in the hospital has had an opportunity to choose, or have selected for him, one book or as many as he wants. The work is in charge of a regular librarian furnished by the Public Library.

Books in these bedside libraries never go back into general circulation. They remain in the hospital service. And from time to time the public library adds to its hospital library stock. For this

purpose a special appropriation has been set side.

Through the cooperation of the Post Office authorities, undeliverable magazines are turned over each month to the library for hospital distribution. Books and periodicals are catalogued according to the public library classification. The material in the bedside library collection is far from being antiquated fiction. Current literature, biography, history and travel books are available.

This branch of library work was started in Providence a year ago.

S. AUGUSTA LEWIS.

Unsightly Marshes Drained by Dynamiting

WILMINGTON, DEL.—Dynamite was freely used by the municipal authorities of Wilmington in their plans to beautify the south entrance to that city by clearing up marshes which for many years had been an eyesore and a mosquito-breeding locality. The Du Pont Boulevard, which stretches the entire length of the state, runs directly by the side of the marsh and thousands of cars pass over it every week-end. It was believed that if the marshes could be properly drained, the unsightly weeds would disappear and the mosquitoes would be eliminated.

To accomplish this a ditch approximately 1,900 feet long was blasted with dynamite. The work consisted in opening up Holland Creek, a small stream which had been filled in during the late war, causing the water to back up in the surrounding marshes. A ditch 6 feet wide and 3 to 4 feet deep was obtained with a single row of holes, each loaded with 3 sticks of 50-per-cent-nitroglycerin dynamite. The soil was a heavy black muck. The holes were spaced 30 inches apart and shot with electric blasting caps and a battery. About 1,000 pounds of dynamite were used.

DYNAMITING DITCHES THROUGH MARSHES AT THE SOUTH SIDE OF WILMINGTON, DEL.

The work was entirely successful, the water in the surrounding marshes being lowered over one foot before the ditch was even fully completed. The blasting was done by C. G. Mathews, a professional blaster. The work was in charge of the City Engineer, and the funds covering the cost were appropriated by the Board of Health and the City Council..

H. L. MAIER, City Engineer.

Basketball Team Brings Community Harmony

AUGUSTA, KY.—The spirit of community cooperation, notably lacking in Augusta in times past, now thrives among the people of this town, and its inception may be traced back to an unusual source—the organization of a high school basketball team.

For some time this town was split into factions, and, as might be expected, community progress was not what it should be, because of the wide differences of opinion of the various groups. Then came the formation of a basketball team among the boys of the local high school. A graduate and former crack athlete of Cincinnati University was secured as coach, and the team soon started to play winning basketball. This was the beginning of a new attitude among the people of Augusta. They gathered at the gymnasium to witness the games and to root for "their" team, and after strenuous and enthusiastic cheering side by side they woke up to the fact that their fellow citizens whom they had previously opposed were not so bad after all. The spirit of team thinking and team playing among

AUGUSTA'S CHAMPION HIGH SCHOOL BASKETBALL TEAM

the boys was infectious and spread to the entire citizenry—and the live local Chamber of Commerce was quick to follow it up and put it to work for the good of the community.

A short time ago the writer had the opportunity of addressing a meeting of the Chamber at Augusta and of seeing the young team presented with trophies for winning the Eleventh District Championship of Kentucky. Over 300 men came out to that meeting—a crowd that would do credit even to a metropolitan community.

HOWARD M. WILSON,
Manager, Civic Affairs Department, Cincinnati Chamber of Commerce.

Chamber Paves Way for Tax Expert to Explain Graded Tax Throughout State

THROUGH the cooperative efforts of the Committee on Taxation of the Portsmouth, Va., Chamber of Commerce, James R. Brown of New York, an authority on taxation and single tax advocate, is planning a thorough campaign to appear before all civic and commercial organizations in Virginia in order that the principles of the graded tax plan as used in Pittsburgh may be better understood.

A letter signed by the President and Secretary of the local Chamber and the Chairman of its Committee on Taxation will be published in a folder which Mr. Brown will issue for the purpose of circularizing these organizations in the state. Letters have also been sent by the Portsmouth Chamber to the various commercial and civic organizations of Virginia urging that Mr. Brown be given a hearing. As a special reason for studying the Pittsburgh plan, the letter as quoted in *Portsmouth Progress*, says:

"Furthermore, it is my personal opinion that if we can put into effect in Virginia, even though in a modified form at first, the plan about which Mr. Brown will talk to you, we will have taken a long step toward becoming one of the greatest industrial states in the Union, as Pittsburgh has become one of the greatest industrial cities."

Mr. Brown has spoken several times in Portsmouth, once before the Rotary Club and also at a public meeting held under the auspices of the Portsmouth Chamber of Commerce. He has aroused such an interest in the graded tax plan that a committee from the local Chamber has been appointed to give it further study and to foster a better understanding of what the plan entails.

For Greater Safety of Street-Car Riders and Pedestrians

To the Editor of THE AMERICAN CITY:

The cooperation between the various safety agencies in Rochester, N. Y., is so commendable that your readers may be interested in knowing of some of the work that is being done here.

The Rochester Police Department, the Rochester Safety Council, the Rochester Engineering Society, the Automobile Club and the Railway are all working together to facilitate traffic and promote safety upon the streets of Rochester. As an example, I might cite the public mass meeting which was held in Convention Hall on April 30 under the auspices of the traffic Committee of the Rochester Engineering Society. Through the cooperation of the Mayor and other city officials, Convention Hall and the Rochester Park Band were donated for this occasion. The speakers included a representative of the Motor Vehicle Bureau of New York State, Captain Andrew Kavanaugh of the Rochester Traffic Police, and representatives of the Automobile Club, the Rochester Chamber of Commerce and the street railway company. The main object of the meeting was to promote safety and facilitate traffic on the streets of Rochester by educating the public regarding the traffic laws of the state and city. About 800 automobile drivers were present. The meeting had the endorsement of many of the civic clubs of Rochester.

Another very commendable work is that of the Safety Council of the Chamber of Commerce in the posting of safety slogans at the main traffic intersections of the city. The bulletin boards upon which these slogans are pasted are about two feet wide and three feet high and are set on the sidewalk near the curb. The slogans consist of only a few words, which are printed in as large letters as possible. The slogans are changed each month.

Traffic counts taken on the main streets in Rochester recently during the rush hours showed that 87 per cent of the riders rode on the street cars. Statistics also showed that many of the pedestrians struck by automobilists were about to board or had just alighted from street cars.

When these facts were called to the attention of the Rochester Safety Council, with the suggestion that slogans be chosen which would result in benefit to the street-car riders and pedestrians as well as the automobilists, the Safety Director of the Railway was immediately asked to submit a list of proposed slogans. This indicates the cooperation existing between the various safety agencies in Rochester.

The following is a list of the slogans suggested to the Rochester Safety Council and which are available to any city that may wish to use them:

1. *Watch out for the pedestrian boarding street cars.*
2. *Be courteous to the public. Give public vehicles the right of way.*
3. *Pass cars carefully.*
4. *If you "cut in" you may be "knocked out."*
5. *Others want to get home safely too.*
6. *Watch your step.*
7. *Signal—everyone is not a mind reader.*
8. *Obey traffic ordinances.*
9. *Accidents cost lives, money, and nerves.*

LEON R. BROWN,
Safety Director, New York State Railways.

Objects of Fire Prevention Inspections

By J. E. Florin

Superintendent of Fire Prevention, Industrial Commission of Wisconsin

CHIEF JOHN KENLON of the New York City Fire Department, in his excellent book on "Fires and Fire Fighters," states that "notwithstanding the difference in construction and occupancy, it is perfectly feasible to fight fires with intelligence, born of systematic acquaintance with certain facts."

Chief among such data is a correct and full knowledge of the construction, occupancy, and contents of the main fire risks in your respective communities. Without such knowledge you will be compelled to fight fire more or less blindly and will be unable to render the best possible service in extinguishing the fire with the least possible property loss, and often unable to keep the fire from spreading. Further, without such knowledge you may not always know how best to rescue humans trapped in the burning building, and brave firemen themselves may become the victims of pitfalls, traps, and accidents in buildings which they must enter to fight the fire effectively.

These thoughts, fully as much as fire prevention, were in the minds of the proponents of the [Wisconsin] law requiring fire departments to make regular inspections of all buildings except the interior of private residences.

Fire Prevention

It is true that the main object of this law is fire prevention, the discovery of physical conditions and dangerous and careless practices which may cause fire, or may cause fire to spread unnecessarily, and a prompt correction of such conditions and practices. A conscientious performance of this duty cannot help but reduce the number of fires and also the average loss per fire.

Some chiefs of good-sized cities and villages mention with a good deal of pride that for long periods of time, in some cases over a year, they have not had a basement fire. They made clean basements, proper installation of basement heating plants, and good protection of all exposed woodwork, a hobby, with the results noted above.

This is a commendable hobby, as experience shows that many dangerous fires start in basements. We say this even though we cannot approve the idea that basements only need to be inspected. The results obtained through this careful basement inspection show what can be accomplished by thorough, conscientious inspection work. When your hobby takes in the attic and the rest of the building, as well as the basement, still better results will be obtained.

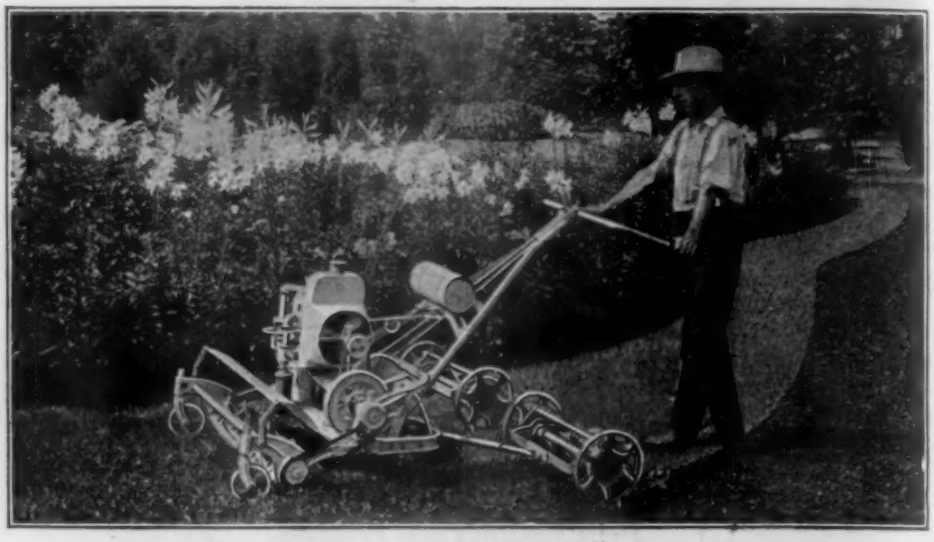
To Fight Fires Blindly Is to Fight Them Foolishly and Recklessly

As previously mentioned in The American City, Wisconsin has a state law requiring firemen to inspect periodically all buildings, except private residences, within their respective cities.

The accompanying outline of the objects of fire prevention inspections was presented by the author as a convention paper before the Wisconsin Paid Firemen's Association, at La Crosse, on July 27, 1926.

You as fire fighters know that you cannot always fight fires in buildings from the street or alley. Your first object is to locate the fire within the building. It is patent that you cannot fight fires within the buildings intelligently and effectively unless you have a thorough knowledge of the entire building structure. You must know the location of all stairways, elevators, light wells, chutes, and other vertical openings through which fire may spread, and which may prove death-traps to firemen. You must know the constuction of the walls, partitions, floors and roofs, and the communicating doors between different parts of the building, to take in lines of hose, to keep fire from spreading, and for other purposes such as rescuing people. You must know the heating and ventilating systems, which often are conducive to rapid spread of fire.

Often small fires, seemingly conquered after a few minutes of work, have become disastrous fires, because the firemen did not know the many concealed spaces, the network of heating and ventilating flues, the many other vertical openings such as chutes, shaft and belt openings, nor unprotected openings in otherwise good fire-walls and partitions. Close inspection of each building alone will give this necessary and important information. Only recently I was called upon to investigate a school-



Model "L", shown above, mows and rolls 4 to 6 acres a day. With gang units attached it cuts 10 acres a day on one gallon of gasoline.

Reputation

COLDWELL LAWN MOWERS have won world-wide reputation as the most dependable lawn mowers money can buy.

This supreme reputation is the reward of strict adherence to Coldwell principles laid down over half a century ago. These principles assure:

Quality materials and expert workmanship plus Coldwell engineering to meet the most severe requirements. Consistent adoption of improvements which would increase the efficiency and better the quality of Coldwell Lawn Mowers. Business dealings based on the long-established Coldwell policy of a square deal to both dealer and user.

Coldwell Lawn Mowers are an important factor in the maintenance of beautiful lawns and parkings in modernly kept-up cities and towns throughout the United States.

LITERATURE ON REQUEST.

HAND — HORSE

SINCE 1867

COLDWELL

DEPENDABLE LAWN MOWERS

GASOLINE — ELECTRIC

COLDWELL LAWN MOWER COMPANY, NEWBURGH, N. Y., U. S. A.

house fire which had started in the basement and was seemingly well under control, when all at once it appeared in different parts of the building, carried there through a network of ventilating flues. The department then sent an S. O. S. to a neighboring city. In spite of the efforts of the two departments, the building was completely gutted. This is by no means an isolated or uncommon case.

Where Ignorance Was Not Bliss

Not long ago I watched the fighting of a basement fire. A hose stream was shot into the basement through a front window. This stream played for what seemed to be a long time before it was discovered that there was a partition between the front part of the basement and the rear where the fire was. This stream could not reach the fire. It certainly was some fireman's business to know that this partition was there. I mention these instances, not in the way of criticism, but to emphasize the great importance of knowing the building in which fire occurs.

Some years ago I investigated a fire in a large building consisting of two parts. The older portion was brick veneer; the newer part had solid brick walls. A brick fire-wall divided the two parts. This wall had two door openings not equipped with standard fire-doors. Moreover, this division wall did not extend through the roof, leaving a common roof and attic over both parts. The fire discovered in its early stages in the veneer portion of the building and in time spread to the new part through these doors and the common roof and attic. The department could not help the common roof construction, but it seemed to me that, even considering this, the new part could have been saved, except, perhaps, the roof. No fight against the spread of fire was made at the two door openings in the division wall.

Many examples of this kind might be mentioned where vantage points for fighting fire were overlooked because of lack of complete knowledge of the building and sometimes, of course, lack of experience in fighting fire.

So, also, close inspection will give to the firemen a knowledge of the contents of the buildings and the manufacturing processes carried on therein. Intimate knowledge of whether or not unclean conditions prevail, what combustible stock is carried, what explosives and chemicals are stored within, and where stored, is essential to fight fire intelligently and effectively. One course of action is proper where oils are stored, another where shavings, sawdust, excelsior, cotton or readily combustible stocks are carried.

Rescue Work and Protecting Firemen

Such intimate knowledge of the buildings, their occupancy, contents and manufacturing processes is necessary, especially on the part of the commanding officer at a fire, to direct rescue work and to protect the lives and limbs of firemen. Too many brave firemen are sacrificed because of lack of this important knowledge. In saying this I do not mean to convey the idea that lack of knowledge has been responsible in all cases for bad accidents to firemen.

Just recently six of these noble fellows were killed in a sawdust explosion in Milwaukee. Some years ago nine Milwaukee firemen met their death in a fire through an explosion of fumes arising from a stock of rubber goods in the manufacture of which rubber cement had been used. In a stamp works fire others lost their lives from being overcome by fumes arising from chemicals used in the building. A few years ago three firemen and five bystanders died, caught by falling brick veneer walls, as a result of a slight explosion within a building.

Further, open elevator shafts, chutes, light wells, weak partitions, walls and roof supports, are a constant menace to firemen in the discharge of their duties. To protect them, these hazards must be known and understood.

You cannot separate a fireman's life from all danger. Danger is incident to his work, but you can know and avoid many of these dangers and pitfalls by making yourself thoroughly familiar with the various buildings and their occupancies.

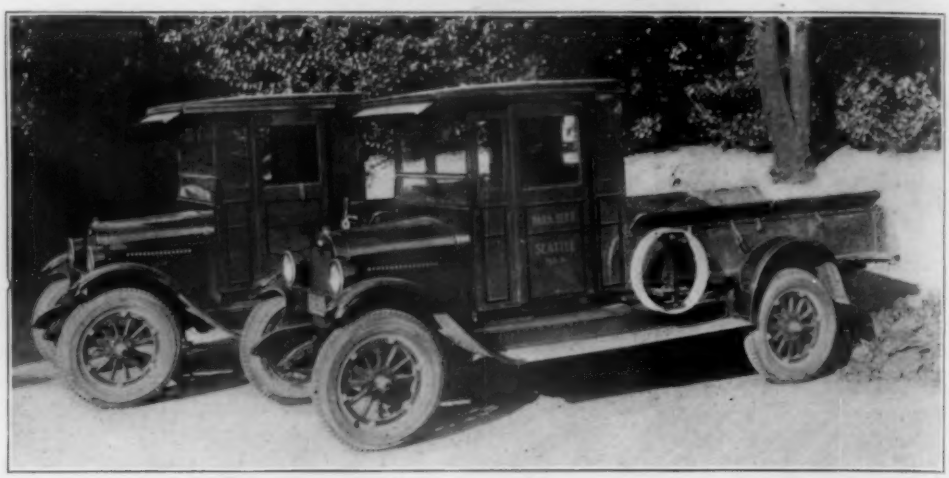
Dangers from Dust Explosions

In the recent Milwaukee fire in which six firemen lost their lives, shavings and sawdust were taken from a storage vault or bin and dumped to a level fifteen feet lower. This sent the fine dust through the air, and it needed only a spark from any source to cause a violent explosion. We have long known the likelihood of dust explosions in flour mills and grain elevators. Such explosions have been quite frequent and extremely violent and destructive.

Some years ago I investigated an explosion in a stock food mill at Layton Park, in which some employees lost their lives. Strongly reinforced walls, eighteen inches thick, could not withstand the force of the explosion. Large, jagged pieces of the walls were hanging, held by the reinforcing rods. A few years

for Economical Transportation

CHEVROLET



"I've Never Operated a Truck that Equaled the Chevrolet for Doing Heavy Work at Low Cost"

Each new day brings to light some new record of the remarkable economy of Chevrolet truck units—some new measure of their amazing endurance and reliability in every field of activity!

The most recent evidence of the reasons underlying Chevrolet's ever-increasing popularity among municipal Purchasing Agents is supplied in a letter received from Mr. Jacob Umlauff, Head Gardener, Dept. of Parks, Seattle, Wash. He says:

"During the years that I have been Head Gardener of Seattle Parks, I've never operated a truck that equaled the Chevrolet for doing heavy work at low cost."

If *your* city is in the market for new or additional truck units you can safely let the experience of Seattle guide you in your purchase—because Seattle's success with Chevrolet trucks is typical of the service delivered by municipally-owned Chevrolet trucks everywhere!

Providing such essential truck-type advantages as rigidly braced channel steel frame; extra-leaved rear springs set parallel to the load; over-size brakes; extra-strong rear axle; reliable semi-reversible steering control; positive three-speed transmission; powerful valve-in-head motor; water pump and combination pump and splash system of lubrication, the Chevrolet ton or ½-ton truck can't fail to give you uninterrupted delivery service at low cost. See your nearest Chevrolet dealer—get all the facts and figures—ask for a demonstration! Then you will understand why so many cities are standardizing on Chevrolet for ton and ½-ton hauls!

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN
Division of General Motors

½-Ton Truck (Chassis Only) $375 1-Ton Truck (Chassis Only) $495
Prices F. O. B. Flint, Michigan

World's Lowest Priced Gear-shift Trucks

ago in a large aluminum factory at Manitowoc an explosion of aluminum dust cost the lives of six employees in the factory. The explosion started in the dust exhaust system. A wire in some way got into the exhaust pipe. When this wire came in contact with the blades of the exhaust fan, a spark occurred which caused the explosion.

It is now pretty well understood that almost any dust fine enough to be held in suspension in the air is explosive. This fact must be kept in mind by firemen when called upon to fight fire in a dust-laden atmosphere. Even at the expense of water damage, a thorough wetting-down may sometimes be necessary to prevent such explosions.

Explosive Liquids and Substances

Inspection must disclose also where explosive liquids and substances are stored, such as gasoline, powder, shells, dynamite, etc., and chemicals which are explosives or give off deadly fumes when coming in contact with water or fire. In urging the safe storage of explosive liquids and substances, I have always emphasized the safety of the occupants and of the firemen in case of fire. Somehow the human appeal goes home where mere property arguments fail.

Examples might be multiplied to show that the fireman must know not only the intricate modern fire-fighting tools—the high-pressure water system, the pumper, the aerial ladder, the various chemical extinguishers, etc., but also the conditions under which these tools must be used to bring the best results.

To summarize, inspections must be made, first, to prevent fire; second, to fight fires intelligently and effectively; and third, to protect the lives of occupants of buildings and the firemen themselves. The commanding officers particularly must be diligent students of many things. Mere "throwing of water" no longer answers. Such studies must include building construction, hydraulics, mechanics, chemistry, physics, and other subjects and sciences. With buildings constantly increasing in size and value, and a multiplication of new and ever newer fire hazards, the fireman's work is a real "he man's job," and not play. The successful farmer of today cannot farm as his grandfather did and succeed, neither can the modern fire chief use methods of fifty years ago.

Good Use of a Blackboard

Some years ago I saw in the main fire-station of one of our cities a blackboard, of which constant good use was made. The department's inspectors on their trips made rough sketches of the floor plans of the principal buildings in the city. Returning to the station, they drew these plans on the blackboard and made them the subject of study. Later, these plans were drawn in a permanent record book, and other plans shown on the blackboard.

It is needless to state that the men in that department knew the buildings in which they were called upon to fight fires, and were prepared to work to best advantage and with increased safety.

"Does he know the 'fire game'?" ought to be an important test in examinations for positions in command of men at fires, not merely, "How long has he served?"

Special Police Defender Appointed by Norfolk City Council

DONALD W. SHRIVER, instructor of the police school of procedure of Norfolk, Va., has been appointed special police defender by City Manager I. Walke Truxtun. He began his work August 15.

The office was created by City Council a few weeks ago upon recommendation of the City Manager. In reporting this new aid to efficient police administration, the Norfolk Division of Police publishes in its Magazine, *The Vigilant*, Major Truxtun's letter to the City Council in advocacy of the ordinance. In this the City Manager said:

"During my entire tenure of office, I have given much time and thought to the Division of Police, and am convinced that the appointment of an attorney to represent police officers at all trials is essential to the proper functioning of the Department.

"That the adoption of this recommendation will increase the morale of the Division is, to my mind, undeniable. The benefit accruing from the appointment of such an officer will undoubtedly be manifold.

"The fact that all members of the Department would then be represented at court, that embarrassment heretofore forthcoming by reason of cases being improperly prepared and presented would be eliminated, that protection would be afforded against the many unjust and in numerous cases untrue charges that are now allowed to remain unchallenged, is sufficient justification for the expense involved.

"When on the one hand police officers realize that their good names are to be protected by the City, and on the other that element of the public who have been disposed to reflect upon the integrity of the Division in the past, clearly understands that derogatory statements must hereafter be proven, then and only then will that esprit de corps be forthcoming that is absolutely essential to its efficiency.

"The expense incident to this office can undoubtedly be cared for from fines that will be forthcoming from the efforts of such an official."

I. WALKE TRUXTUN.

In addition to his new duties Mr. Shriver will continue his classes at Police Headquarters. In these courses he instructs officers on how to gather evidence, how to arrange a case, and how then to present it in court. The city administration regards this work as of great value to officers in aiding them in the performance of their duties.

Autocar Trucks of "Conventional Design"

Extract from a letter that was sent to all Autocar users on August 20, 1926

We have started production on Autocar trucks of "conventional design"—with the engine under a hood out in front. These will be provided in capacities corresponding to our present line.

These additions to the Autocar line of motor trucks mean a further extension of the long-established Autocar policy of providing the correct wheelbase length for every hauling need. We have always believed that wheelbase length is an important factor in the economical operation of motor trucks. Increasing traffic congestion in all hauling centers makes short wheelbase handiness more important and a greater source of time-saving economy every year. We shall continue to build, recommend and sell short wheelbase, engine-under-the-seat trucks.

The Autocar truck, with the engine out in front, is changed in appearance only. It is the same Autocar truck whose economy and dependability have already been demonstrated in your service. It has the same 4-cylinder engine, the same transmission, the same rear axle, and will be sold at the same price schedule as our trucks with the engine under the seat. It is built in the same Factory and sold and serviced at the same Branches.

THE AUTOCAR COMPANY

H. K. McConnell

Ardmore, Penna.
Est. 1897

President

Manual versus Automatic Control of Signals on State Highways

IN the September number of this magazine there were published letters to THE AMERICAN CITY from the Mayors of three New Jersey municipalities commenting on a statement by W. G. Sloan, State Highway Engineer of New Jersey, which had appeared in the previous issue. This statement defended the policy of the State Highway Commission in refusing to approve, on any state highway, the installation, maintenance or use of any traffic-regulating device which is automatically controlled or manually controlled from a point so remote that the operator is not able to see the traffic conditions at the point or points affected.

As explained in the editorial note on this page, traffic devices on state highways were definitely removed from control by municipalities in New Jersey by act of the 1926 Legislature. Nevertheless, officials of municipalities traversed by state highways naturally have opinions of their own in this matter of manual versus automatic control of signals. Letters to THE AMERICAN CITY from the Mayors of five other municipalities are here published:

Town of Morristown, N. J.

My objection to the resolution on traffic regulations, as adopted by the State Highway Commission of New Jersey, are more of a basic nature than a matter of detail. As to the matter of detail, I have never believed that it is practical to lay down a general rule that will fit conditions that have such wide variations as exist in traffic control throughout the various municipalities of New Jersey with their wide ramifications. It may be, however, that Major Sloan has worked out a resolution which he believes is flexible enough to meet the varying conditions which we know exist.

My main objection, however, is of a basic nature, and is two-fold:

1. The law under which the Highway Commission attempts to take jurisdiction of traffic regulations in the various municipalities of the state is not specific but is negative in character. It is an amendment of an old law which gave municipalities the power to regulate traffic, and the amendment is of such a nature that power is given to the Highway Commission by indiscretion.*

* EDITORIAL NOTE.—The legislation criticized by Mayor Potts is the following section of the New Jersey act concerning municipalities, the amendment adopted by the 1926 Legislature being shown in italics:

"The governing body of every municipality shall have the power to establish safety zones, to erect, construct and maintain and operate standards, commonly called 'silent policemen,' beacon lights, guideposts or other structures, which in its judgment may be necessary for the safety and convenience of persons and vehicles using the streets in said municipality; *provided, however, that nothing herein contained shall apply to any portion of any state highway of this state.*

I cannot believe that the Legislature could possibly have known, when it passed this amendment, that it was taking away from the municipalities power to regulate traffic on state highways and placing it in the hands of the State Highway Commission. How much better it would have been if the law had plainly stated that it was the intention to vest in the State Highway Commission the power to regulate traffic on all State highways throughout the State, plainly giving them superior powers over the municipalities in such regulation.

2. The resolution attempts to determine which of the municipalities are financially able to police the state highways running through their confines. The State Highway Commission, having determined the financial abilities of the municipalities, arrogates to itself the power to fix the regulations relating to traffic so that the municipalities may be forced to spend amounts which the Highway Commission feels they are financially able to spend, on traffic regulation.

It surely could never be contended or argued that the State Highway Commission should have superior power over the finances of a municipality to that delegated to its chosen representatives; neither can it be argued that the Legislature intended, or can intend, that the Highway Commission should have superior powers over the police department of any municipality of the State greater than those of the governing board of the municipality. This, however, is the effect of the resolution and the municipalities are faced with two alternatives—either to submit to the regulation of its financial affairs and its police departments by the Highway Commission, or to withdraw its police departments entirely from doing police traffic duty on state highways.

If the municipalities of the state could, by concerted action, accept the latter alternative, the next session of the Legislature would, no doubt, provide a suitable state police force under the direction of the State Highway Commission for policing the state highways. I see no objection to the Legisture's providing this police force for traffic regulation. On the other hand, I think it would be a good thing for some of the smaller municipalities that are over-burdened by the immense flow of traffic over the state highways which run through their limits.

Until this amendment was passed, which the State Highway Department reads as giving them police powers over the highways, we had always supposed that the State Highway Commission was a constructive board, and that it was administrative only in the matter of maintaining the surface of the highways. If it reads this inconsequential and indirect amendment as vesting it with police powers to the extent that it can control traffic over the state highways, then I think the State Highway Commission should go to the next Session of the Legislature and ask for authority to police the state highways and ask for a sufficient amount of money to organize and maintain a proper police department for such policing. Certainly they should not attempt to bring the police departments of the smaller munic-

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Section of Firestone Gum-Dipping Units with one tower cut away to show interior.

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AMERICANS SHOULD PRODUCE THEIR OWN RUBBER... Harvey S. Firestone

ipalities, either in whole or in part, within their jurisdiction unless they stand ready to pay for the maintenance of the same.

CLYDE POTTS, Mayor.

City of Asbury Park, N. J.

The action of the State Highway Commission in asking the courts to restrain the city of Asbury Park from suspending and operating automatic traffic lights over Main Street, Asbury Park, because that street is a part of the State Highway Route No. 4, is an assumption of authority that is surely ill considered and unwise and is a bad precedent to establish either in New Jersey or elsewhere when one considers the vast problem involved today everywhere in the matter of traffic regulation.

All streets within city or town limits undoubtedly should be under municipal control, particularly in so far as public safety is concerned.

Asbury Park recently adopted a comprehensive plan of traffic control, like unto the systems in use in New York, Atlantic City, and many other cities of the country, and completely covering the entire city.

The total cost of the system is $16,000 per year for a period of ten years. The system embraces 100 traffic lights suspended throughout the city with a clearance under them of fourteen feet, and the cost mentioned covers erection, maintenance and operation. Eighteen of these lights are suspended over Main Street, one at each street intersection. These eighteen Main Street traffic lights therefore cost the city $2,880 per year, and will most adequately and properly control traffic and provide safety on that street.

Main Street, Asbury Park, is admitted by the State Highway Commission to be, during the summer season at least, one of the heaviest traveled and most congested sections of any state highway in New Jersey. The State Highway Commission knows that traffic control is absolutely necessary on that street, but takes the arbitrary stand that policemen on posts should be used instead of the automatic traffic-light system proposed.

To maintain such police regulations would mean a cost to the city of at least $25,000 per year, as against $2,880 under the city's plan. And above all the State Highway Commission does not offer to pay the cost of such police protection to insure safety.

Last year in Asbury Park over 400 motor accidents occurred, 110 persons were seriously injured, and 3 killed. This was a heavy toll to exact of the public, and the safety of motorists, as well as the safety of all, has to be considered.

In July, 1925, before the installation of traffic lights there were 25 bad motor crashes and 14 persons seriously injured in Asbury Park. In July 1926, with the lights installed, there was one motor crash and that caused by a motorist violating a traffic light.

I cannot believe the State Highway Commission is reasonable or wise in its contention, nor can I believe the courts will agree with its decision. But, if the courts of New Jersey do so rule that the Highway Commission is legally right in the assumption of such authority, then it is time for all cities and communities to give careful consideration to the extent to which power is being delegated to state boards and commissions; else we will in a short time in New Jersey be a government entirely by such boards and commissions.

Credit has been given the Highway Commission for certain good work it has done, but I cannot believe the people are yet ready to give the Highway Commission title to the highways of New Jersey in fee simple for all purposes.

CLARENCE E. F. HETRICK, Mayor.

Borough of Rutherford, N. J.

I believe that all traffic within municipalities, whether local or through, should be regulated by the police department of the municipality. Where state and county roads are involved and the foreign traffic is sufficiently large I believe the municipality should work out its traffic plan in cooperation with state and county departments, but that it should be regulated locally. In such cases a basis of remuneration should be provided, so that the municipality could be reimbursed for any expense to which it might be put in addition to its normal police requirements. This might not be feasible, but the principal need is for standardization.

I hope to see at some time in the near future a state conference of police departments, state, county and local, and the Commissioner of Motor Vehicles, out of which shall come a state-wide uniform method of handling each traffic problem, and that a sign, street marking, light, or traffic regulation will mean the same in North Jersey as it does in South Jersey. Then I hope to see similar conferences between adjoining states with a view to accomplishing the same thing on a larger scale. Standardizatioin such as this would reduce the cost of handling traffic and provide infinitely more efficient methods for so doing.

FLOYD N. DULL, Mayor.

Borough of East Rutherford, N. J.

In view of the fact that the borough of East Rutherford is so situated that some of the heaviest traffic in the state passes through it, I believe that the municipality certainly should have something to say in the matter of handling this traffic.

Paterson Avenue, carrying traffic from New York, Jersey City, and Hoboken to Passaic, Paterson and other cities west, has a very heavy volume of traffic. Hackensack Street, which crosses Paterson Avenue, carries traffic from Hackensack and points north, to Newark and points south. State Highway Route No. 17 will shortly be in operation, and will further add to traffic congestion on Paterson Avenue.

This borough has a number of traffic signals which during the rush hours are operated by police officers, and in the so-called non-rush hours are worked automatically. The automatic signals are a great saving to the borough, as they help to displace a number of policemen. As this borough has a population of approximately 8,000 inhabitants, the cost of adding additional police means quite a burden on the taxpayers.

I believe that the local municipalities should have control of the traffic when it reaches the borough limits, as the local officials certainly are acquainted with the local traffic conditions, and know what is best to handle the traffic in their municipalities.

JOHN H. EDWARDS,
Mayor.

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Only twelve gallons of this new "Tarvia-KP" are needed to a cubic yard of stone to make a perfect patching mixture.

Greatly increased binding strength is the answer, of course—developed after many months of careful research and testing.

Try this new 12-to-1 "Tarvia-KP" mixture. You'll find that it gives you worthwhile savings in cost of materials—and a better job.

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FOR COLD PATCHING

Town of Hammonton, N. J.

If municipalities must pay to control traffic on state roads through the towns and cities then it is to be assumed that local traffic will be favored in traffic rather than the through traffic.

I have always contended that the state should pay for the policing and traffic regulations on its highways.

Why should Atlantic City or any other city pay for traffic officers in any other community? Every citizen supports the state highways and can use them; therefore every citizen should help pay the expense of controlling them.

DR. CHARLES CUNNINGHAM,
Mayor.

Rules Governing Traffic-Control Devices on State Highways within Cities and Villages of Michigan

UNIFORM regulation of traffic on trunk highways within cities and villages, as far as compatible with local conditions, is the aim of a set of regulations issued in September by C. M. Babcock, state highway commissioner of Michigen. A circular, which has been mailed to the governing bodies of all cities and villages through which trunk highways pass, calls attention to the decision of the State Supreme Court holding that the Highway Department has general regulation over trunk highways, both within and without the municipalities, and suggests that local ordinances be revised to conform to state regulations.

The aim of all regulation, the circular states, should be to allow traffic to flow freely and naturally, and, by eliminating indecision, make for better and safer traffic control. Traffic control devices are held unnecessary where the traffic through an intersection is less than 3,000 vehicles per day. Where there is heavy traffic for short periods of time, it is recommended that the devices be manually controlled instead of automatic.

In a statement summarizing its regulations, the Department says:

"'Mushrooms,' 'beacons,' and other warning signals, when installed in streets which enter trunk highways, should be placed in the center of the throat of the approaching street. They may be installed on the trunk highway only under the following conditions:

> "No device or light standard may be installed on a trunk highway where the paved or surfaced width is less than 38 feet.
>
> "No device may be installed in the center of an intersection where left turns are permitted, unless the clear width between curbs of one of the intersecting roads is 50 feet or more. A rigid type of standard will not be permitted.
>
> "No signal or device may be placed on a trunk highway without a permit.

"Trunk highways will be designated as 'through highways' where local police will undertake to enforce it and where traffic conditions warrant. The department will furnish, erect, and maintain 'stop' signs on roads so designated. Such designations, however, will not be made in isolated cases, but through a series of cities and villages.

"In order to bring about uniformity in parking, and to eliminate congestion, the following regulations are commended for use on trunk highways:

> "No parking shall be permitted within a distance equal to 20 feet, plus one-half of width of intersecting street, from center line of any intersecting street.
>
> "No parking shall be permitted which does not leave a clear width of roadway at least 24 feet wide. In case of divided or one-way streets, at least 12 feet must be kept clear for traffic in each driveway.
>
> "In the case of streets with single-track car lines, where the cars run against the flow of traffic, at least 12 feet must be left clear between the curb and the clearance-line of the street car.

"The regulations do not affect streets marked with trunk-highway signs in cities of the first class, because under the constitutional amendment trunk highways end at the city limits of such cities."

To Assure Completion of Utilities in New Real Estate Subdivisions

A DETAILED local code of ethics for subdividers, which constitutes one of the most advanced steps yet taken by a specific local group of subdivision specialists to establish a high standard of procedure for safeguarding the purchaser in the development of new residential areas, has been adopted by the Subdividers' Division of the Chicago Real Estate Board. The code is an amplification, to fit local conditions, of the general code for all Realtors, to which all members of constituent boards of the National Association of Real Estate Boards must subscribe.

As to completion of promised public utilities the code specifies:

"Where property is sold upon representation that sidewalks, paving and curbing, sewers, or other utilities, will be furnished, either

"(a) An adequate bond shall be required that such improvements to the extent advertised, or represented, will be made; or

"(b) The property must not only be owned in fee simple, but be free and clear of indebtedness; or

"(c) A fund shall be set aside which shall be sufficient, with the addition of the subdivider's first payment on the property, to carry out the improvements program in accordance with the further provision made in Article VIII."

Article VIII specifies:

"Where property is sold with improvements, and where payments are made on a subdivision to a trust company, or where property is owned in fee by the subdivider, a fund shall be set aside for improvements, of such a size as to enable the completion of an improvement program within two years following date of contract, this time contingent only upon strikes and such other unavoidable delays as may be beyond the control of the subdivider. Where improvements are included in the price of the lot, they should be started within three months of the date of the contract of sale, and completed within two years thereafter. Where improvements are not included in the price but are promised by special assessment, special assessment proceedings should be inaugurated within one year. The contract should specify whether or not improvements are to come in by special assessment or otherwise."

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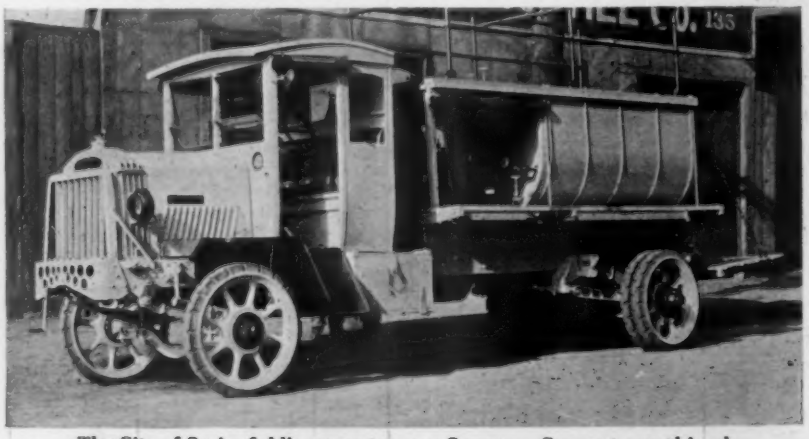
Built in sizes from 12 gallons per minute at 300 pounds' pressure to 75 gallons per minute at 1000 pounds' pressure—on skids—horse-drawn or on trucks with pump driven from truck engine, and with interchangeable bodies when desired. No climbing necessary with our sprayers. Catalog on request.



The City of Springfield's apparatus as a Sprayer. See next month's ad.

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Municipal Accounting and Finance

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The Information Needed in the Management of a City's Finances

IN every field of financial management, specially adapted information is needed for sound decision and effective action.

In commercial business two financial statements are essential for guidance of all interested parties. These are the balance sheet and the statement of operations; they are the most important of all commercial statements, since they summarize the financial condition which has been attained and the factors which have produced the gain or loss for the year. The balance sheet reflects the adequacy of working capital, the ability to pay current obligations, the values of properties and the amounts of their reserves, the stockholders' or owners' equity, and the accumulated earnings. In all important decisions relating to the finances of a commercial business these statements are indispensable.

In the management of a city's finances, however, the balance sheet is of subordinate importance. It is essentially a reflector of capital invested or net worth, since it opposes all assets against all liabilities. A city has no capital or net worth either in the accounting or the economic sense. Its most valuable asset, taxing power, cannot be valued and therefore must be omitted from its balance sheet. The values of its properties—its land and buildings, streets and sewers—have little or no relation to its financial condition; they are not available to pay debts nor to mortgage as security for debt; when stated in a balance sheet they produce a surplus which has little significance. Moreover, the most important properties of a city—its streets, sewers and riparian rights—are generally impossible to appraise. Finally, funded debt, which is usually the largest liability of a city, when stated in its balance sheet has no other effect than to reduce the meaningless surplus by the inclusion of fixed properties.

There is, however, a statement of assets and liabilities, which has an important, though limited, bearing on city management. We refer to the current balance sheet which presents the current assets of cash, taxes and other accounts receivable, opposed to the current liabilities of salaries and wages payable, accounts payable, etc. This statement is essential in the executive action involved in providing cash to meet immediate obligations.

The companion of the balance sheet, the commercial form of statement of operations, we also find has no useful place in city management. This statement presents revenues less

Information Defined:

Information consists of all the facts which are essential to correct understanding. An incomplete or inaccurate statement does not constitute information; it misleads instead of informs.

The Necessity for Clear Expression:

In order to constitute information a statement of facts must carry with it understanding. Information consists of a conveyance of facts from one mind to another. If there is no understanding, there is no information. The language must be clear.

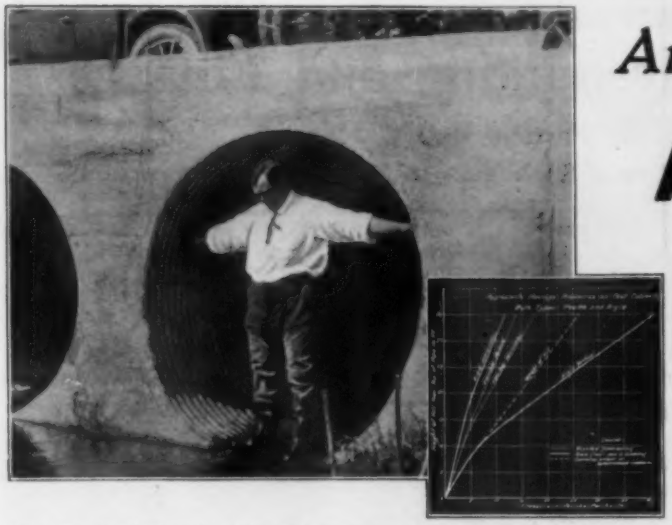
The Necessity for Relevancy:

There is useless and useful information. Useless information is that which does not relate to any practical problem. It may be interesting, like the estimated value of the territory of Alaska, but it serves no practical purpose. Useful information, on the other hand, is that which is needed to reach a decision or to take action.

The Necessity for Promptness:

To be useful, information must be conveyed in time to take action when action is needed. Too many doors are closed after the third or fourth horse has been stolen.

—*Copyright, 1926, Francis Oakey.*



Note the vertical and horizontal pressure curves for the flexible type culvert show that the pressure is evenly distributed over the top and sides, while with the rigid type the load concentrated on the top of the culvert is even greater than the weight of fill.

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ARMCO Culverts now offer an easy, better way to bridge small streams. In sizes from 60 to 108-inch diameters the same economies are obtained that have made the smaller size ARMCO Culverts the preferred drainage structure, namely—

1. Low cost of handling and placing.
2. Speed and simplicity of installation.
3. Freedom from repairs.
4. Ample strength—no breakage.
5. Great durability—low cost per year of service.

Large diameter Armco culverts provide great drainage capacity at so low a cost that there need be no contraction of the roadway. No foundations or abutments, no bridge floor repairs, no painting, no maintenance expense.

Heavy gauge metal, exclusive with Armco, gives added security in the severest service, when needed. From the A. R. E. A. test at Farina, Illinois, has come authoritative proof of the soundness of Armco design.

The service of Armco engineers for assistance in design and instalation—is yours for the asking.

Armco Culvert & Flume Manufacturers' Assn.
Middletown, Ohio

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expenses or profits less losses, and arrives at an excess or deficit. It reflects, in fact, the results of the efforts to produce as great an excess as possible of revenues over expenses. This effort does not or should not exist in city management—instead the effort should be to raise only enough revenue to meet the expenses. In commercial business money is spent to produce revenue. In city management exactly the reverse is true—money is raised to pay expenses. Moreover, the commercial form of statement of operations is entirely inadequate to reflect the operations of a city, since it is confined to revenues and expenses and excludes all capital items such as money received on loans, money disbursed in the payment of loans, and disbursements for fixed properties. A statement of operations adapted to city management must present all receipts and expenditures, including on the one hand not only revenues but also the proceeds of bond sales and of sales of property, and on the other hand not only expenses but also expenditures for additions and betterments of fixed property and for the retirement of debt. This statement, however, while important, is subordinate in character; it should be used to support the budget statement, which is the foundation of intelligent management in municipal finance.

Condensed Budget Summary

In this summary the expenditures and the means of financing are classified as follows:

EXPENDITURES

1. **Expenses of administration, operation and maintenance**
2. **Additions, betterments, and replacements of depreciating property**
3. **Purchases of land**
4. **Interest on debt**
5. **Redemptions of debt**
   - **(a) Sinking fund charges required to redeem all debt at maturity**
   - **(b) Redemptions not provided for by sinking funds**
   - **Total redemptions of debt**

Total expenditures

MEANS OF FINANCING

1. **Cash balance at beginning of year available for expenditure**
2. **Revenues**
   - **(a) Taxes for the current year on real and personal property, less reserve for uncollectable taxes**
   - **(b) Collections of taxes of past years**
   - **(c) Miscellaneous revenues**
3. **Borrowings**
   - **(a) To finance additions, betterments, and replacement of depreciating property**
   - **(b) To purchase land**
   - **(c) To retire maturing debt**
   - **Total borrowings**

Total means of financing

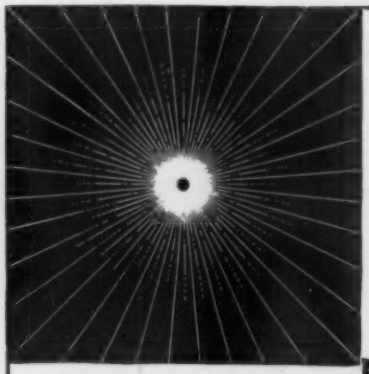
Surplus or deficit

The Budget Statement as the Basis of Financial Management of Cities

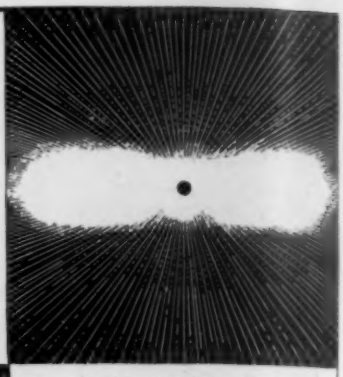
Effective financial management of a city consists, first, in wise expenditure for the maintenance of essential public services in a state of sufficiency, and second, in sound financing of the expenditures. This requires preparing two programs in advance, one for expenditure and the other for financing—in other words, a budget. When these programs are reduced to figures, a budget statement is the result, projecting into the coming year (1) the amounts which it is proposed to spend to support the several services which the city must render to its citizens, and (2) the means by which it is proposed to finance these expenditures. In its most effective form the budget statement should include in comparison with its estimated figures the actual expenditures and receipts of the previous year. At the end of each month of the year to which the estimates relate, the accumulated expenditures and receipts are included in a third column to indicate how the program is developing.

With this statement the administrator is equipped to discharge intelligently his most important duties relating to the finances of the city. With this statement before him he can investigate and correct, if possible, unsatisfactory conditions which may arise. If revenues are not materializing in accordance with the program, the statement will show it; if expenditures are being made at a rate not contemplated in the program, the statement will also show this. Balance sheets and statements of past operations do not convey these essential facts. At the time the budget is prepared the current balance sheet contains only one item of importance to the executive and that is the balance of cash available for future expenditure. During the year the chief use of the current balance sheet is to guide the executive in providing cash to pay current obligations as they arise—a minor duty in comparison to directing the program of expenditure and financing. In discharging this main duty, it is apparent that the values of fixed properties and the amounts of funded debt payable a long time hence is information which is of little value to the executive. It is apparent also that the statement of operations of the period which has passed, unless presented in comparison with the estimates of a program looking to the future, consists of information of nothing more than historical value on which intelligent executive action cannot be taken.

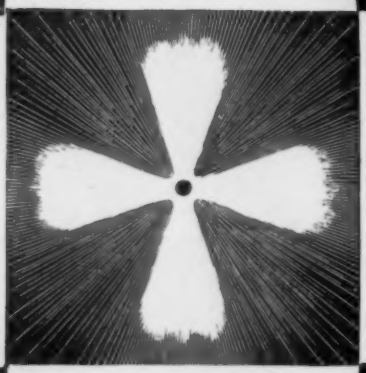
The budget statement consists of a condensed summary of estimated and actual expen-



Light distribution of bare lamp

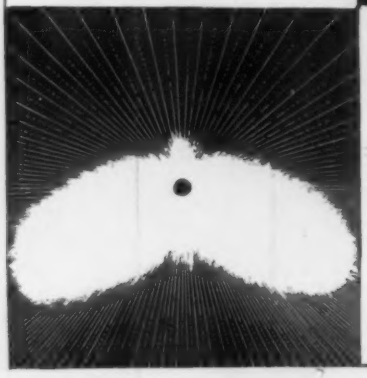


Light distribution of Holophane 2 way Refractor

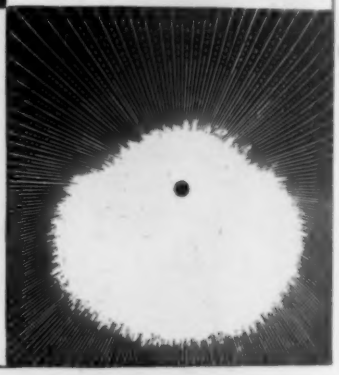


Light distribution of Holophane Bilux Refractor

Light distribution of Holophane Asymmetric Dome



Light distribution of Holophane 4 way Refractor



All diagrams show light distribution on ground

Practically every street lighting engineer specifies

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ditures and the means of financing for the city as a whole, supported by a number of detailed statements.

Content and Use of Municipal Budget Statement

The following paragraphs outline the significance of the captions listed in the "box" on page 567.

1. EXPENSES OF ADMINISTRATION, OPERATION AND MAINTENANCE:

This caption describes the total of the city's living expenses for the year; it is the aggregate of the running expenses of all departments—for example, the main items which it includes are:

(1) The amounts of all payrolls, except those representing expenditures for additions, betterments and replacements of property, which are included in expenditure item number 2.

(2) The amounts of all expenditures for supplies, printing and stationery, telephone, telegraph, rent, postage, insurance, heat, light and power, etc.

It is obvious that expenses of these classes should be financed out of revenues. Whether this practice is being followed is readily ascertainable by examining the purposes of the borrowings.

2. ADDITIONS, BETTERMENTS AND REPLACEMENTS OF DEPRECIATING PROPERTY:

This item includes all expenditures made in adding to, improving or replacing property commonly referred to as fixed or permanent but which through wear and tear eventually becomes comparatively valueless. The main classes of property of this character are as follows:

Buildings
Streets, curbs and gutters
Sewers
Docks, bridges and ferries
Machinery and equipment

The properties required to operate municipally owned public utilities, such as water-works, are not included, since they should be treated separately and in accordance with commercial practice.

It will be noted that land is not included. This is because land is not subject to wear and tear and its ownership does not carry with it the burden of replacement.

A separate total for the expenditures on depreciating property is important because this figure is the basis for determining whether the city is each year paying out of revenues a due proportion of the cost of providing a sufficient capacity of property. To settle this question it is not important to differentiate between (a) additions, (b) betterments, and (c) replacements; it is sufficient to consider the total of these three items as the cost of providing property. For instance, if the share of this cost for a given year were $1,000,000, and this amount were spent in restoring worn-out buildings instead of purchasing entirely new and additional ones, the year's share of providing property would have been contributed just the same.

This total must be compared with the amount under "Borrowings" entitled "To Finance Additions, Betterments and Replacements of Depreciating Property." The amount by which the expenditures exceed the borrowings, is the amount of additions, betterments and replacements of depreciating property financed out of revenues—a most important figure in determining whether the year is paying its share of the cost of providing property. The year's proper share is the total annual depreciation of all property subject to wear and tear.

3. PURCHASES OF LANDS

This caption hardly needs explanation. The reasons for separating it from the expenditures for other property have been explained. It should be compared to the item under "Borrowings" entitled "To Finance the Purchase of Land"; it must never be less than this item—if it is, the statement is erroneous; it may equal the amount of borrowings, which means that all land purchased is financed by loans—generally a perfectly sound policy; if the expenditure item exceeds the corresponding item under "Borrowings," it means that to the extent of the excess the cost of land is being financed out of revenues.

4. INTEREST ON DEBT:

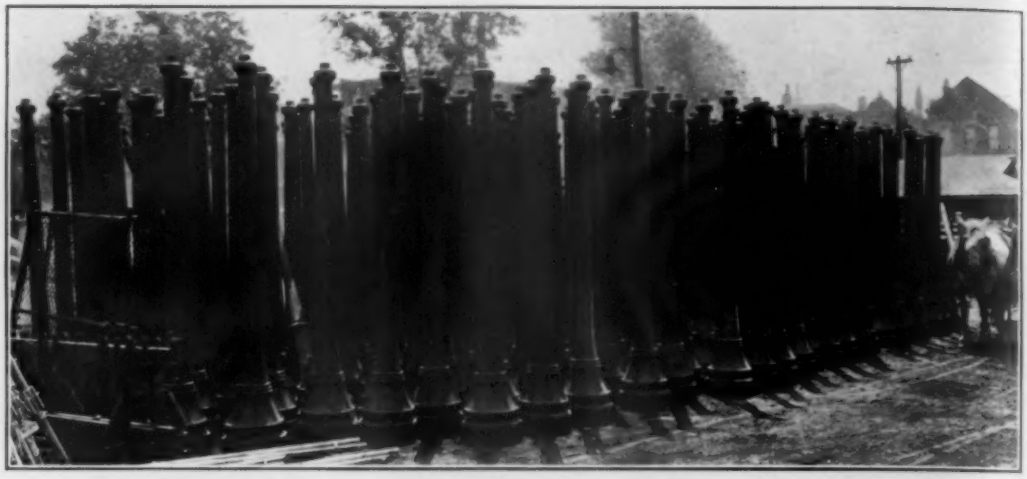
This item should include all interest, after taking into consideration any changes caused by issue of new, or redemptions of old, loans. It is well to compare this item with the total amount of revenues, to see what percentage thereof is being expended on interest and to what extent revenues are thus restricted. This percentage should be compared with the same percentage of prior years, to see whether the restriction of revenues on account of interest charges is increasing or decreasing and at what rate.

5. REDEMPTIONS OF DEBT:

Under this caption, sinking fund charges are included, because from the standpoint of financial management they are in effect installments on the mortgage. From this standpoint the transactions which are involved in redeeming debt at its maturity out of accumulated sinking funds are not important; these transactions would be included as offsetting items on both sides of the budget statement in order to show the complete story of redemption.

It will be noted that the following caption is used: "Sinking Fund Charges Required to Redeem All Debt at Its Maturity." Sometimes this caption cannot be used because the annual sinking fund charges are inadequate, that is, will not produce a fund sufficient to redeem all debt at maturity. In such cases the caption should be as follows: "Sinking Fund Charges as Provided by Law (See Debt Statement)." Then, in the debt statement the facts as to insufficiency can be set forth.

The caption "Redemptions Not Provided For by Sinking Fund" represents the amounts of debt falling due within the year for which sinking funds either do not exist or are insufficient. This item should be compared with the item under "Borrowings" entitled "To Retire Maturing Debt." If the expenditure item exceeds the item under "Borrowings," the meaning is that redemption to the extent of the excess is being paid for out of revenues—an indication of a conservative policy. If the expenditure item equals the item under "Borrowings," then all redemptions are being refunded. If the expenditure item is less, the statement is erroneous.



For *Chicago*—Six More Carloads *of* KING STANDARDS

THE City of Chicago, too, is now installing King Ferronite Standards of one-piece construction. The above photograph, taken in a City yard, represents part of a recent order for nine hundred standards.

King Ferronite Standards, because of the features in their manufacture which assure long-time service without continual cost for repairs and replacements, are being accepted universally as the practical lighting system—a combination of the beautiful and efficiently useful.

Scores of cities, large and small, throughout the country are placing King Standards on their streets

Your city's street lighting should be a long-term investment. Selection of the correct materials can make it such.

KING - GRAYBAR Street Lighting Specialists can assist you in planning "the show window of yohr city."

Consultation is cost-free; installation is risk-free.

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Means of Financing

1. CASH BALANCE AT BEGINNING OF YEAR AVAILABLE FOR EXPENDITURE:

This item represents the balance of cash in the general fund at the end of the year over and above all liabilities and encumbrances (outstanding orders and contracts). It may be an important figure in connection with each year's financing; in any case it must be included.

2. REVENUES:

The items under this main heading hardly require definition. The item of taxes represents the total of the tax toll. The reserve for uncollectable taxes is an important item, but one which is often omitted, which sometimes results in an unanticipated deficit. Collections of taxes of past years is also an important item, since it may have an effect on the tax rate of the current year when conservatively estimated.

Miscellaneous revenues consists of licenses, permits, privileges, franchises, rents, interest, etc., the proceeds of which are not by law applicable to special funds. The total revenue from these sources is often a considerable amount and has an important effect upon the tax rate.

3. BORROWINGS:

There is no more important section of the budget statement than that relating to borrowings, because it is the basis of considering the most significant question, namely, whether or not the city is living within its means and is borrowing wisely. The division of the total borrowings into three parts is highly important.

The amount of borrowings to finance additions, betterments and replacements of depreciating property should be considered from the most critical standpoint, because it is this class of financing which is most commonly unsound. If the amount of these borrowings equals the expenditures for these purposes, it means that the year is not paying its share of the depreciation and obsolescence of the property used. In fact, there should be a considerable excess in the amount of expenditures over the amount of the borrowings for these purposes, since this means that to the extent of the excess the year's revenues are being used to pay for the year's share of depreciation and obsolescence of property. Whether the year's full share is being thus financed can be determined only from data showing the estimated amount of annual depreciation.

Borrowings for the purchase of land are separately stated in order not to confuse the consideration of the important questions discussed in the preceding paragraph. It is entirely sound to borrow for this purpose, provided the purchase prices are reasonable.

The amount of borrowings to redeem maturing debt is separately stated for several important reasons. The necessity for such borrowings is the result of an unsound financial policy in past years, consisting of the failure to accumulate out of revenues adequate sinking funds for the redemption of debt. It indicates an existing defect in financial condition requiring gradual correction. It is obvious that the amount of such borrowings should not exceed the amount of expenditures to redeem maturing debt for which no sinking funds have been established. If these borrowings equal the expenditures for this purpose, it means that no part of such redemptions are being made out of current revenues—a situation which is justified provided adequate sinking fund charges are provided to redeem at maturity the new debt issued. If such sinking fund charges are not provided, an unsound policy exists, which if continued will eventually lead to embarrassment.

The Need for Relevant and Clear Information

Few persons are informed as to the finances of the city in which they live. Even those who own property or have local business interests generally have little knowledge of the essential facts which determine the financial condition of their city and the tendencies of the expenditures and of the means of financing. Frequently, public officials are not fully informed in respect to those subjects. This is due, not so much to lack of interest as to the failure of the city officials to make the essential information available in understandable form. Frequently, elaborate statements are prepared which do not convey the facts affecting the main questions, which are: are:

1. Are expenditures being made wisely to support the essential public services in a state of sufficiency?

2. Are the means provided for financing the expenditure sound?

The Detailed Statements Supporting the Condensed Budget Statement

The condensed budget statement is intended to convey a general understanding of the financial policy of the city. It serves to show in summary terms what the city has done, is doing, and proposes to do. The conclusions to be drawn from it are of the utmost importance; in fact, it is thought that no comprehensive thinking respecting a city's finances can take place which does not begin with a consideration of the condensed summary statement of the budget.

Naturally, such consideration leads to a variety of questions respecting the details of past, present, and proposed expenditures and financing. The information needed to answer such questions should be supplied in certain detailed supporting statements. These will be discussed in subsequent articles.

Previous articles in this series on Municipal Accounting and Finance, written for THE AMERICAN CITY by Francis Oakey, C.P.A., have been:

July, 1926, "Safeguarding the City's Treasury by Sound Accounting"

August, 1926, "Functions of the City Comptroller or Auditor"

September, 1926, "Factors Which Affect the Financial Condition of a City"

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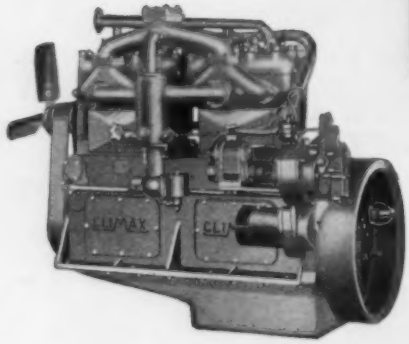

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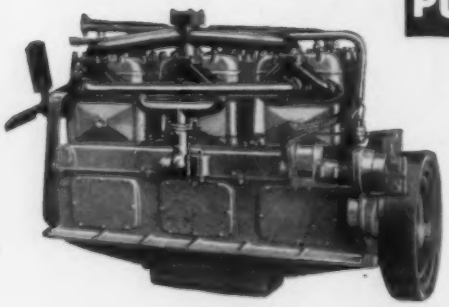

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Factors in Rate Regulation: Depreciation

By Benjamin Cohen

IN the preceding article the writer attempted to point out the importance of firmly establishing the principle that depreciation should be deducted from cost (original or reproduction new at any date) in arriving at "value" for rate-making purposes. While the United States Supreme Court has definitely decided that such deduction must be made from reproduction cost new,* the lower courts and commissions have not consistently followed the rule laid down by the Supreme Court, apparently because of lack of understanding. This has resulted in conflicting decisions and theories and has caused, in the minds of the judges, commissions and others concerned in rate litigation, an amazing amount of confusion and many erroneous assumptions. The decisions of courts and commissions have been so at variance that one can cite appropriate *lower court* decisions upholding almost any argument on this question.

That this condition should prevail is not at all surprising, for the courts have been literally bombarded with all sorts of arguments and theories on this subject. One of the most frequent arguments made by the proponents of the theory that there should be no deduction for depreciation from original cost (or reproduction cost new at any time) in fixing the basis for a rate, is the assertion that if a plant operates satisfactorily it cannot be in a depreciated state. The utilities advance what has become known as the "service efficiency" theory, which holds that where a plant is in good operating condition and functions efficiently, no depreciation exists. Unfortunately, they have been moderately successful in converting some commissions and courts to this view. The experts who appraise property on this basis usually deduct from the full reproduction cost new of the property they appraise only such amounts as will cover the cost of urgent repairs or deferred maintenance.

They ignore entirely the depreciation which is present in every plant, but which has not yet progressed to the point where repairs or replacements are immediately required. It can be easily observed where repairs are urgently required—as, for example, where roofs are leaky, where painting is required on brickwork, or where repainting should be done. The latent depreciation existing in a plant cannot be so easily estimated; to ascertain this requires a careful examination of the equipment in the plant by engineers skilled in this type of work. Because of the difficulty of ascertaining and estimating this existing depreciation, some representatives of the utilities deny its existence entirely.

What this leads to was demonstrated in a recent gas case on which the writer was engaged. An appraisal prepared by the engineering witness for the gas company contained, among other items, about a dozen gas holders. Of these, about half were very small holders, having a capacity of 250 thousand cubic feet of gas each, built as long ago as 1860, and of a type of construction which has since been abandoned. The company also owned some holders which were built quite recently—within the past ten years—and of a capacity between 2,500 or 5,000 cubic feet of gas, from ten to twenty times the capacity of the smaller ones. Yet the valuation placed upon the old, small holders averaged about 25 cents per cubic foot of capacity as against only 10 cents for the new and modern ones. The error, of course, lay in not making any deduction for the depreciation of those holders—for they were proven to be badly worn due to age, obsolete and inadequate. Yet, because the company saw fit to use them occasionally, its witness swore they were as good as new and that they should be valued as new, and that no depreciation applied thereto. A more complete depreciation than this case furnishes would be hard to find, for it has all the elements of depreciation, namely, wear and tear, obsolescence, and inadequacy, which, authorities on the subject agree, are the main factors contributing to depreciation. Yet a value per unit of capacity of two and a half times that of the modern holders was claimed for these old holders!

This situation is the inevitable result of the process of reasoning which forms the basis for the "service efficiency" theory. According to that theory nothing is depreciated, or affected by depreciation even to the slightest extent, until the moment that it ceases to function and has to be thrown into the scrap heap. Take, for example, an automobile. So long as the engine will run and the car get about, it is, according to this school of thought, as good as new. It becomes depreciated, they claim, on the day it has to be scrapped. Yet the proponents of the theory know that if that car were taken to a dealer the day before, he would allow only junk value, a fractional part of the cost new—probably from ten to twenty per cent—because the car is eighty per cent depreciated, and eighty per cent of its useful, efficient service life has elapsed. That which is true of the life

* Knoxville vs Knoxville Water Co., 212 U. S. 1.

GMC Big Brute with street flusher equipment in service at Baltimore, Md.

A recent purchase of 180 GMC Big Brute Trucks by the Department of Streets of New York City demonstrates the great favor with which this "super" truck has been received.

GMC Engine:

Unit block and crankcase keep bearings in permanent alignment.
Removable cylinder walls cast from special alloy iron of exceptional wearing qualities.
Piston pins case hardened and lapped.
Rigid crankshaft with ground and polished bearings of large size.
Camshaft with hardened and ground bearings and cams.
Alloy steel valves.
Burnished timing gears.
Positive pressure lubrication to all bearing points.
Air cleaner keeps dirt and grit from engine.
Combination thermo-syphon and pump cooling prevents overheating.
Positive governor prevents operating at injurious speeds.
Engine mounted on rubber cushions.
Multiple dry disk clutch, with very large frictional area.
Transmission with over size alloy steel gears and shafts.
Universal joints, all metal and enclosed.
Rear axle with fewer contact points and held in permanent alignment by radius rods.
Springs of alloy steel.
Steering gear with enclosed ball and socket tie-rod joints.
Brakes: On the 1 and 1½ ton models 4 wheel brakes distribute the friction and also eliminate excessive wear on rear tires. On the 2½ ton and larger models floating cam brakes increase the life of brake linings as they will operate efficiently until entirely worn out.
Oversize rear tires are standard equipment on all heavy duty models.

Only GMC Trucks give you all these features which insure

Long Life

Most trucks offer *some* of the features. —but only GMCs give you *all* of them. That is why they are noted for their unusually long life, wherever trucks are used.

For instance: The Hugh McRoberts Coal Co., of Staten Island, New York tells us that their first GMC ran for *11 years* hauling coal and cement blocks over all kinds of roads and then was sold to another concern. Another of their GMCs after *12 years of continuous service over 115,000 miles* is still on the job; while its companion with *9 years of service and more than 75,000 miles* to its credit is still going strong.

If enduring serviceability such as this means anything to you, you should investigate GMC Trucks.

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and value of an automobile is similarly true of other pieces of equipment.

The experts who make a practice of appraising all property as though it were new, when confronted with facts such as these, usually try to dodge and evade a definite statement and seek a way out of their absurd position by making the statement that even if the individual pieces of equipment are proven to be depreciated, there is no depreciation in the plant as a whole because it functions properly. It is apparent, of course, to anyone that in a plant composed of many units of equipment which are in various states of depreciation, the total depreciation must necessarily be the sum of the depreciation of all the units. The reason why the proponents of the immortality theory deny the existence of depreciation in the plant as a whole, is because in cross-examination they can successfully avoid admitting that depreciation exists in a plant which operates satisfactorily, but they are not able to deny the existence of depreciation when confronted with facts about individual items of plant. The easiest way out of their untenable position is, therefore, to maintain that the sum of many depreciated pieces of equipment is a plant without any depreciation whatever and fully as good as new and of the same value as a new one.

Items of Public Utility News

Rapid Transit System Proposed for Detroit

DETROIT, MICH.—An initial rapid transit system proposed for the city of Detroit and adjacent municipalities, costing $187,789,000 and involving a total of 46.6 miles, is recommended by the Rapid Transit Commission in its recent report to the City Council. The plan calls for four lines, covering routes in both north and south and east and west directions. Of the 46.6 miles of route proposed, 42.7 will be in Detroit, and of the total construction cost, $172,001,000 is to be borne by Detroit.

Under the plan announced the taxpayers as a whole will pay 17 per cent of the construction costs; property adjacent to the subways and the stations will pay 51 per cent, and 32 per cent of the cost will be borne by the car riders, the law providing that a rate of fare shall be charged sufficient to meet that proportion of the cost.

It is proposed to make each year's budget for the next ten years carry an item of $4,300,000 for subway purposes, all of which is to be raised by taxation; and to raise $12,900,000 annually for the next ten years by special assessments levied against property adjacent to the lines.

As only construction costs of the railroad structures are included in the above figures, mortgage bonds will be issued to buy equipment. These bonds will not be a lien against the city but rather against the equipment itself. The commission reports that the $172,000,000 construction estimate covers the cost of the railroad structure through the streets, either under, above, or on the surface, or the cost of the so-called "permanent way" of the lines in Detroit. This is the cost in which the Detroit public is chiefly interested because the money to meet it must be raised by local assessment and taxation of the city at large. The cost of equipping the lines for operation with tracks, signals, cars, power, yards, shops and other equipment appurtenances and for right-of-way real estate will be paid for by the passengers' fares. The equipment bonds will therefore be self-supporting. Among the conclusions set forth by the commission are that the initial system, except for a short length of elevated line made desirable by the exigencies of location, should be constructed as a two-track tunnel way system—that is to say, in subway at stations and in tunnel between stations, thus avoiding the disturbance of the subsurface structures in the streets to a very large extent, and reducing to a minimum the interference with street traffic during the prosecution of construction work.

It is recommended that because of the limitations imposed by the rapid transit act, a continuous construction program be followed and that work be started in the first year on one line, and in each year thereafter on one of the other lines included in the four routes, in succession and in the order noted in the commission's report, and that the work be prosecuted continuously so that all of the lines may be completed and placed in operation within the thirteenth year of the construction period—the first within six years, the second within eight years and the last two within twelve and thirteen years respectively after the construction work begins.

It is recommended that the cost of constructing and equipping the initial system be financed under the "pay as you go" assessment plan already approved by the people by a referendum vote, in order that all of the beneficiaries of such a rapid transit system, the taxpayer, the landowner, and the rider, may each pay his proper share of the cost of the system and the service on it.

It had been planned to submit the proposal to the voters at the Nov. 2 election, but because of serious opposition to the proposed method of financing and other features of the plan, Mayor John W. Smith has expressed the opinion that additional time should be given for a thorough study of the whole project before final action.

Speeding Up the Movement of Chicago Traffic

CHICAGO, ILL.—Enforcement of the new ordinance which prohibits parking within 50 feet of traffic signal lights in business districts is speeding up the movement of traffic to an unprecedented degree, according to the police and Surface Lines officials. The restriction is serving to promote better vision at street intersections, facilitate loading of passengers and minimize delay at congested street corners. A regulation to prevent the blocking of vehicular and pedestrian traffic by building construction companies has also been proposed by the police traffic division.

Armored Truck for Seattle Utilities

SEATTLE, WASH.—The public utilities committee of the City Council has approved a request of the Superintendent of Public Utilities, for the purchase of a 1-ton armored truck at a cost of $1,500 for use in transporting receipts of the Municipal Railway from the car-houses to banks and from banks to car-houses. The car will carry an armed guard. It will displace the present system of using a small, worn-out truck fitted with an iron chest. The cost of employing a regular armored bank truck for this purpose is estimated at $5,010 yearly. The cost to the city for using its old car is $4,255. It is held that this can be reduced with a new car. The car will also transport tokens and transfers.

Trucks..Loads..Profits Saved By Air.

HEAVY trucks giving miles of extra service. Fragile loads carried without breakage. Maintenance costs lower than ever before.

These factors are putting heavy trucks everywhere on Budd-Michelin Dual Wheels and *pneumatic* tires. The swing toward Duals is gaining momentum every day.

The clumsy, road-pounding truck is out of step with modern transportation. Heavy trucks are becoming swift. Long hauls are being made in shorter time. The racking of the truck, the punishment of the driver are no longer necessary.

Budd-Michelin Dual Wheels made possible the rapid development of the bus industry. Enabled giant buses to ride on pneumatics and get from 15,000 to 20,000 miles from a set of tires. They brought passenger comfort, lower operating costs, express-train speed with safety.

Heavy trucks on Duals are getting the same advantages. Advantages that are revolutionizing transportation on the highways. Changing the whole conception of the heavy truck's usefulness. All truck manufacturers will deliver any new job on Duals. Any truck can be converted, too. Ask any dealer—or write us.

BUDD
WHEEL COMPANY
Detroit

The Budd-Michelin equipment—two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units). All wheels completely interchangeable either as units or as halves of Duals. One spare.

An Important Decision Which Establishes Precedents in Tennessee Public Utility Law

TENNESSEE.—The Tennessee Railroad and Public Utilities Commission has given out its decision in the matter of the application of the Tennessee Eastern Electric Company for increase in rates and the fixing of valuation of the company's property for rate-making purposes. In the long-drawn-out and hard-fought contest of almost six years in which the city of Johnson City has opposed the claims of the company, almost every question that could have any bearing on the operation of a public utility has been raised and has been adjudicated by the Commission. The recent decision settles issues, so far as the Utility Commission is concerned, that vitally affect hydro-electric development and the operation of public utilities throughout the state and rates that may be charged the public.

The Tennessee Eastern Electric Company operates a hydro-electric development near Greeneville on the Nolachuckey River and a large steam plant on the Watauga River four miles north of Johnson City. The steam plant is used as an auxiliary to the hydro plant. The company supplies lighting and power current to Greeneville, Jonesboro, Johnson City, Embreeville, and other towns and communities in upper East Tennessee.

In 1920, the company applied to the Board of Commissioners of Johnson City for its approval of an increase in rates, which was refused. In September, 1920, the company filed application with the State Commission for an increase in rates. The City of Johnson City, through Mayor W. B. Ellison, filed protest. The Commission ordered an appraisal and inventory of the company's property. Since that time numerous hearings have been held, volumes of testimony of experts taken, briefs filed and oral arguments heard. The Commission granted the company a temporary increase in rates effective May 1, 1922, pending the determination of the rate base, over the protest of said city. December 31, 1924, was fixed by the Commission as the date as of which valuation of the property should be determined. The company insisted that it was entitled to a valuation as of that date of $6,659,878, including the following intangibles: Compensation to promoters and cost of financing, $400,000; compensation for added risk, $254,254; going value, $776,519; working capital, $247,198; water-power value, $2,000,000.

The Commission's engineers, after analyzing all the testimony, recommended that the rate base be fixed as of December 31, 1924, at $2,470,000. The City of Johnson City insisted that $2,075,641 was a proper valuation. The Commission, in its decision, fixes the valuation at $2,500,000, allowing no part of the company's claim for water-power value, promotion, or added risk, and reducing their claim for going value to $220,000 and for working capital to $50,000.

This case establishes a precedent in Tennessee public utility law in that it decides what elements of value may and what may not be capitalized and vested with earning power and also establishes the basis or datum line upon which to ground physical valuation of property, the essential factor in scientific rate-making.

While the Commission does not indicate in its decision what effect the establishment of a rate base will have on present rates, it is generally understood that rates will be reduced.

Wage Increase Without Fare Increase

DETROIT, MICH.—The tentative wage increase for the platform men of the Department of Street Railways announced in June and which provides an advance of 2 cents an hour, was put into effect after having been agreed to by the employees. The increase, it is estimated, will cost the department approximately $210,000 annually, but no increase in fares has been necessary and none is anticipated as a result of this wage increase.

This increase took effect in two steps of 1 cent each on July 1 and August 1.

The tentative agreement provides the following rates for motormen, conductors and motor coach operators:

First 6 months, 67 cents an hour
Second 6 months, 71 cents an hour
Thereafter, 75 cents an hour

The hourly rate for one-man car operators and operators of motor coaches or busses seating 35 passengers or more are:

First 6 months, 72 cents
Second 6 months, 76 cents
Thereafter, 80 cents

A number of special requests and provisions were included affecting scheduled weekday runs, the percentage of total number of runs to be completed within certain specified consecutive hours, and the allowance of additional time bonuses for long runs.

Expert Whose Studies Helped Fort Worth to Secure Lower Rates for Electricity

To the Editor of THE AMERICAN CITY:

In your Public Utilities Department for August you published an item regarding the recent reductions in rates for electricity in Fort Worth. In justice to all concerned I should be glad to see credit given to the several experts whose studies aided the city in reaching a successful and amicable agreement with the utilities company.

The investigation was started by Mark Wolff, of the American Public Utilities Bureau of New York, who made a preliminary report last summer. After a complete inventory and appraisal of property made by the Fort Worth Power & Light Company itself, Mr. Wolff made a further report. Then we were greatly aided by work done by Delos F. Wilcox of Grand Rapids, who prepared a review in detail covering both Wolff's report and the report of the utility company, giving his opinion and advice in connection with both reports. Finally, the matter was brought to a successful conclusion through a detailed examination of the Fort Worth Power and Light Company report made by Charles Wellington Koiner of Pasadena, as an operation expert, and C. A. Winder of Fort Worth, who had spent many years with the General Electric Company and who was, therefore, very familiar with the prices of various equipment.

The result was an agreement between the Fort Worth Power and Light Company and the city of Fort Worth under which, as mentioned in your August item, lower rates have gone into effect resulting in an estimated annual saving of some $200,000 to users of electricity in Fort Worth.

O. E. CARR,
City Manager.

Fort Worth, Texas, August 25, 1926.

6 miles more of Trinidad!

A double driveway, two stretches of 3 miles each—Victory Drive, Savannah, Ga.—the city's highway to and from Tybee Beach—laid in 1922. The Commissioners of Chatham County recognizing the long life and low maintenance cost of Trinidad Native-Lake Asphalt chose this product of nature in preference to man-made substitutes.

They selected Trinidad because it has stood the test of nearly a half-century—because it has been fully demonstrated that Trinidad pavements are attractive, easy to keep clean, easy to repair, resilient, and free from noise.

You'll be interested in Bermudez Road Asphalt, too—for *road* building. Write us for data.

THE BARBER ASPHALT COMPANY

Philadelphia

New York Chicago Pittsburgh St. Louis Kansas City San Francisco

TRINIDAD LAKE ASPHALT

Zoning Notes

Prepared by Frank B. Williams
Author of "The Law of City Planning and Zoning"
From data collected by the Zoning Committee of New York (233 Broadway)

Recent Zoning Laws and Ordinances

LOUISIANA.—Laws 1926, No. 240—Standard form; applies to cities, towns and villages. Does not repeal former act.

YORK HARBOR, MAINE.—Ordinance, April 17, 1925

Business Buildings in Residential Zones

LOUISIANA.—*State ex rel. Dickson v. Harrison, Building Inspector of Shreveport*, 108 So. Rep. 421. An ordinance prohibiting the erection of business buildings within residential zones, save in such instances as the city council may grant by special ordinance permission to do so, is discriminatory and unconstitutional, in that it prescribes no uniform rule of action applicable to all similarly situated, but leaves it to the whim and fancy of the city council.

Regulation and Restriction of Private Camping Grounds

MAINE.—*York Harbor Village Corporation v. Libby*, (*Supreme Court*) August 11, 1926. By Public Laws, 1926, Chap. 209, the state authorized cities of over 35,000 inhabitants and village corporations to regulate and restrict the location of certain kinds of dwelling houses and tenement houses, and of camping grounds conducted for private gain; and provided that camping grounds maintained contrary to ordinance should be nuisances.

The York Harbor Village Corporation, on April 17, 1926, adopted an ordinance regulating and restricting camping grounds conducted for private gain to specified zones within the limits of the corporation, and dividing the entire corporate territory into two zones, designated respectively as Zone A and Zone B. In Sec. 2 of the ordinance it was provided that:

"No person shall within the limits of Zone B conduct for private gain a camping ground or grounds."

The defendants were maintaining a public camping ground within the limits of Zone B for private gain. *Held*, that a temporary injunction should be granted forbidding its maintenance. There is no evidence that the ordinance is arbitrary, unreasonable or discriminatory.

With regard to the character of the village the Court says:

"The town of York is essentially a summer resort. It has no important industries or commercial enterprises. Its chief and only substantial business is such as arises in the course of supplying the needs of summer visitors and residents. The native population is limited. The summer residents are numerous and their property holdings are extensive. The residences are of an expensive type, with spacious grounds. It is a town distinctly of summer homes. The camping ground heretofore maintained by the defendants is immediately adjacent to one of the residential areas of the character described."

New Jersey Courts Uphold Restrictions of Garages and Gasoline Stations

NEW JERSEY.—The decisions continue to follow the Nutley case, adverse to the exclusion of business and ordinary industry from residential areas. In accordance with previous decisions, however, the courts continue to uphold restrictions of the location of garages, as shown by the following cases:

Long v. Scott, Building Inspector of City of East Orange, 133 Atl. Rep. 767. The application of a zoning ordinance in refusing a permit to erect a gasoline station directly opposite the end of a parkway and on an important avenue in a residential district is not an unreasonable exercise of the police power.

Contras v. Mayor and Alderman of Jersey City, 131 Atl. Rep. 122. The refusal of a permit to erect a public garage in the vicinity of frame apartment houses and in a district zoned for residence purposes does not justify the issuance of a peremptory writ of mandamus.

In accordance, *Bloom v. Ventnor City*, (*Supreme Court*) October 8, 1925.

Board of Adjustment Recognized by New Jersey Chief Justice

The following note in the Bulletin of the New Jersey State League of Municipalities, of July, 1926, is of interest:

ZONING VICTORY

Mr. George H. Harris, Town Attorney of Montclair, writes as follows:

"I have a zoning matter to bring to your attention which I think you should communicate to all municipal attorneys within the League.

"On June 26 I succeeded in having the Chief Justice deny an application for a writ of mandamus under the 1926 statute and to award instead certiorari. This is a substantial victory because if the Board of Adjustment functions properly and has an official finding of fact that a certain building in a certain place would tend to affect the health, morals, safety, and welfare of the people, we shall then have something for the upper court to review, and under the well-established rules of certiorari, they may hesitate to upset the finding of fact of the Board of Adjustment.

"The case was the Chancellor Development Corporation against the Town of Montclair."

Setback Provision Invalidated

It has been the contention of the advocates of zoning in New Jersey that the area provisions of zoning ordinances had not been invalidated by the New Jersey decisions. Of interest therefore is the following case:

Rudensky v. Senior, Inspector of Buildings of Town of Montclair, 133 Atl. Rep. 777, to the effect that a regulation in a zoning ordinance requiring buildings to be set back 25 feet from the street is invalid. Previous cases in accord cited.

Nor can a building permit be denied because plans did not provide for a side yard as required by ordinance where there is no evidence that such

4 Reasons Why Snow Costs Dropped $47,000

Barber-Greene reduces the cost of Handling Snow to 5.7c per yard.

This fleet of four Barber-Greene Snow Loaders effect an estimated saving of $47,000 per season for the Boston Elevated.

Conservatively, each loader does the work of 100 men during each eight hour shift—or 300 men per 24 hours on a three shift basis.

In dollars and cents this total saving amounts to a gross of $400 per shift. Deducting interest, depreciation, operation and maintenance, establishes a net saving of $336.13 per shift for each loader.

During the average season of 35 shifts, the loader's savings amount to $47,000.

These savings explain why the Boston Elevated has since added 5 more Barber-Greenes to their original fleet of 4.

Faster Loading

It is no uncommon occurrence to have a Barber-Greene load 7 yard trucks with snow in around 40 seconds.

Because of this exceptional speed trucks are kept moving. Fewer trucks do more work. And the city's streets are put on a "pre-snow basis" in much less time than ever before.

And Barber-Greenes never tire. One of the Boston Elevated Loaders worked 112 hours at a stretch after a heavy storm — without a stop for coffee, sandwiches or adjustments.

Make Appropriations Do More

With Barber-Greenes the average cost of loading snow is reduced to 5.7c per yard — an unusually low figure. On Boston's 14.7 inches average yearly snowfall, the four Barber-Greenes pay for themselves twice each season.

With such phenomenal savings in actual dollars and cents your appropriations can be stretched farther than ever. Tax payers can be given better and faster snow removal in winter and more and better streets in summer.

Send for a copy of Modern Snow Removal — and for our cost reports — and look this over.

When Barber-Greenes are not busy clearing your streets of snow in winter, they can be converted into efficient bucket loaders. In this capacity they help to build new streets, and repair old ones—or they can handle a hundred and one odd loading jobs, garbage handling, sewage sludge loading and similar tasks that men care little about doing.

BARBER-GREENE COMPANY—*Representatives in 50 cities*—515 West Park Avenue, Aurora, Ill.

BARBER GREENE SNOW LOADERS

The Barber-Greene Snow Loader can be converted into a standard Barber-Greene Bucket Loader for summer work. The bucket loader loads any loose or semi-loose materials.

See 1927 ROAD SNOW

a requirement for a building, such as a store and apartment building, proposed to be erected, is necessary for public health and safety.

Garage and Gasoline Station Restrictions Upheld in New York Also

NEW YORK.—*Apollo Building Corporation v. Walsh, et al.*, (*Supreme Court*) reported in *New York Law Journal*, August 9, 1926. The applicant bought a corner lot in a residence zone, knowing the facts, and promptly sought permission to build a large public garage on it. The Board of Appeals decided against him. The Court sustains the decision of the Board with costs, holding that there was no merit in the application.

NEW YORK.—*Friedman Realty Co., Inc., v. De Stefan*, 127 Misc. Rep. 608. In an action by this plaintiff for the rent of premises which it leased to the defendant "to be used and occupied as a gasoline station and for garage purposes" a judgment for the plaintiff must be reversed and its complaint dismissed where it appears that, unknown to the parties therein, at the time of the execution of the lease and prior thereto, said premises were affected by a zoning ordinance which restricted the use thereof to "business purposes only" and prohibited the operation of a gasoline station on or in the vicinity of the premises, since the lease, being for an illegal purpose, was void from the beginning.

NEW YORK.—Application of *Boyd v. Board of Appeals of City of New York*, (*Appellate Division*) reported in *New York Law Journal*, August 31, 1026. Where petitioner made application to the Board of Appeals for permission to erect a garage on a school street, *held* that though the Board of Estimate, under its zoning resolution, permitted the Board of Appeals to use its discretion in passing upon such applications, by another part of the resolution, which prohibited garages of certain kinds in school streets, the Board was deprived of any power to vary the provisions of the resolution.

The fact that other garages were situated on a school street and were erected prior to the enactment of the foregoing resolution does not change the circumstances of the case.

Recent Zoning Literature

The annual report of the Board of Adjustment of the City and County of Denver, Colorado, for 1925 is a model report, clear in statement, and full of interest to students of zoning. The illustrations are a veritable illumination of the text.

The City Engineer of New Bedford, Mass., has published an account of the doings of the Board of Appeal for that city and its effect on zoning there since the adoption of the ordinance. The report appears in the *New Bedford Sunday Standard* for August 29, 1926.

The Zoning Board of Appeals of Cincinnati, Ohio, has issued, in mimeograph form a report of its doings from its inception on May 4, 1924, to May 4, 1926. During this period 12,900 applications for building permits were made to the Commissioner of Buildings, requiring hearings before the Zoning Board in only 3.13 per cent of the cases, of which 2.45 per cent were granted and 0.68 per cent denied. These statistics indicate that the requirements of the Building Zone Code were at least 99.32 per cent operative. Each resolution deciding the cases before the Board was adopted, after debate, but finally without a dissenting vote. Not one applicant has sought a review by the courts of any decision rendered by the Board.

Milwaukee Limits Height by Cubical Contents

Wisconsin Supreme Court Ruling No Setback to Zoning

A RECENT decision of the Wisconsin Supreme Court holding unconstitutional an anti-skyscraper law enacted by the Legislature, has been assumed in some quarters to have invalidated the provisions of the recent Milwaukee ordinance under which the cubical contents theory has been applied to the limitation of building heights. The fact is, however, that the decision of the Supreme Court was not a blow to zoning, but was a recognition of the validity of constitutional home rule in Wisconsin.

In the case under discussion (State ex rel. Ekern, Atty. Gen. v. City of Milwaukee, 209 N. W. Rep. 860), the maximum height of buildings in cities is declared to be a "local affair" under the Constitutional Home Rule Amendment, though such affair may also be a state-wide concern; hence the city validly elected not to be bound by a state statute limiting such heights. In support of its position the Court says:

"If, then, the subject matter of the height of city buildings were to be excluded from a city's 'local affairs' there would seem to be no consistent theory other than one excluding such as relate to the width of highways, boulevards, sidewalks, the manner of laying water pipes and sewers, parking regulations and the enormous number of matters subject to the ever-increasing spirit of regulation embodied in statutes, charters and ordinances. The same would be true as to the regulation as to materials for paving of and the traffic regulations on the highways within the particular cities or villages, such highways being also for the use and disposal of the general public as distinguished from the residents of the particular community in which such highways are, and the same may be said as to very many of the other subjects of regulations by statute or ordinance."

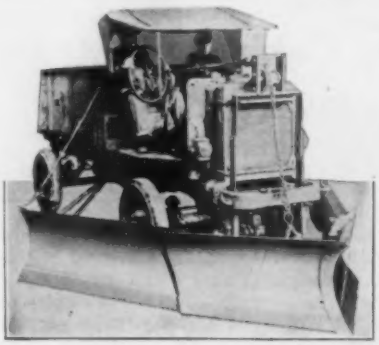
An interesting outline of this case and of the height limitations in the Milwaukee ordinance is contained in the following statement issued August 28, 1926, by the National Association of Real Estate Boards:

"Recent decisions of the Wisconsin Supreme Court holding the state's anti-skyscraper law unconstitutional will not be a setback to city planning and zoning in the state, the Milwaukee Real Estate Board points out in a communication sent to the National Association of Real Estate Boards.

"The Court's ruling that building-height limita-

"I consider it a privilege to recommend Baker Snow Plows"—

Baker Snow Plows are made in both "V" and blade types for attachment to any standard motor truck or leading industrial tractor.



Baker "V" Truck Snow Plow With Wings

So writes a Street Superintendent. Hundreds of others say it in other words. Still others say nothing but purchase Baker Snow Plows year after year. Satisfactory service not only through one snow storm but one hard winter after another, is the reason for the widespread use of Baker Snow Plows in thirty-three states.

Hydraulic lift for the big plows, Safety Tripping Blades on all blade plows, stiff construction and a good fit on your truck or tractor are features that appeal to every road or street official. Choose from the many types and models of Baker plows. Every plow a good plow.

Ask for attractive 48-page Catalog

The Baker Manufacturing Co.

503 Stanford Ave. Springfield, Ill.

BAKER SNOW PLOWS

FOR MOTOR TRUCKS AND TRACTORS

tion must be a matter coming under the home rule vested in its cities by the state's constitution leaves intact all work on the newly enacted Milwaukee charter ordinance, intended to supplant the recently invalidated state law, and basing height limitation on the cubical content theory.

"The Milwaukee ordinance, passed April 12, 1926, provides that in a district designated by a height district map no building or structure shall be erected the cubical content of which exceeds the sum total of the area of the lot upon which it is to be erected, multiplied by 125 feet. Inner courts not opening upon alleys or streets or yards are to be considered as parts of the cubical content of any such building.

"The maximum height to which any building or structure may be erected under the ordinance is 250 feet.

"Towers for ornamental purposes only are permitted above a height of 125 feet and up to the 250-foot limit, provided that the maximum cross-sectional area does not exceed 25 per cent of the cross-sectional area of the building, and provided further that no part of the tower shall be closer than 25 feet to any lot line not also a street line.

"The Milwaukee Public Land Commission and the Milwaukee Real Estate Board in cooperation have been engaged for a year on the study of the cubical content theory as applied to the proposed ordinance. Such a plan of limitation, the Board points out, permits a building to be erected at a desired height and still safeguards the supply of light and air for adjoining property owners and prevents undue congestion in the streets.

"Exercise of the police power in zoning has been approved by the Supreme Court of Wisconsin in the case of Carter vs. Harper, and in several subsequent decisions, and the question of validity of police power in the making of an anti-sky-scraper law did not enter into the recent decision holding a state building-height law unconstitutional, the Milwaukee board points out."

The Municipal Bond Market

By Sanders Shanks, Jr.
Editor, *The Bond Buyer*

FOLLOWING the quiet months of July and August, activity in the municipal bond market during September was stimulated by the offering on the first day of the month of $28,750,000 bonds of the state of New York. The bonds bear interest at the rate of 4 per cent and were sold at a net interest cost to the state of 3.83 per cent. Other state issues sold during the month were $7,500,000 Missouri 4¼s, to net 4.21 per cent; $3,000,000 Alabama 4 and 4½s at a 4.39 per cent yield, and an issue of $600,000 Maine bonds bearing 4 per cent interest, at par. The second largest offering of the month was a $10,000,000 Pennsylvania loan.

Although the bond dealers were in the market to replenish their stocks to meet the early fall demand for high-grade issues, the tendency of prices was toward a lower level.

Total issues for the month will be greatly in excess of August offerings, which amounted to $60,902,239, the smallest of any month since 1923.

MORE IMPORTANT OFFERINGS LAST MONTH:

Amount	Issue	Maturity	Rate %	Yield %
$28,475,000	State of New York	1927–1976	4	3.85
600,000	Maine	1927–1941	4	4.00
1,200,000	Nassau Co., N. Y.	1928–1938	4¼	4.12
721,164	Utica, N. Y.	1927–1946	4.20	4.14
630,000	Greenwich, Conn.	1927–1949	4¼	4.15
450,000	Delaware Co., N. Y.	1927–1956	4.20	4.19
7,500,000	Missouri	1943–1949	4¼	4.21
1,000,000	Kansas City, Mo., School District	1946	4½	4.22
3,000,000	Alabama	1927–1960	4 & 4½	4.39
500,000	Sussex Co., Del.	1934–1953	4½	4.41
347,000	Hackensack, N. J., School District	1928–1956	4½	4.42
1,000,000	San Francisco, Calif.	1930–1969	5	4.43
1,236,200	Akron, Ohio	1928–1936	5	4.55
432,000	Lincoln Co., W. Va.	1927–1942	5	4.91
5,000,000	East Bay Municipal Utility Dist., Calif.	1935–1974	5	4.96
1,165,000	Hillsborough Co., Fla., Con. Spec. Tax, Sch. Dist. No. 4	1928–1956	5	5.11
600,000	Jefferson Co., Fla.	1931–1945	5	5.42
875,000	Fort Meyers, Fla.	1956	5	5.69
500,000	Columbia Co., Fla.	1956	6	5.92
1,840,000	Fort Lauderdale, Fla.	1946	6	6.27
635,000	Dade Co., Fla., Spec. Tax Sch. Dist. No. 5	1929–1956	6	6.31

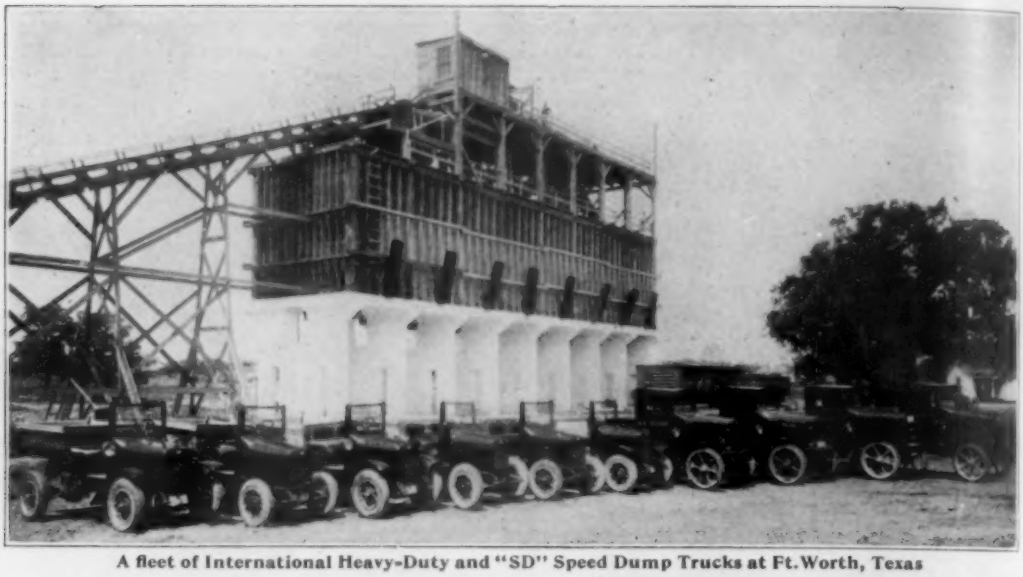
Paying for Values Which the City Itself Creates

IN a recent leading editorial, *The Sun* cites New York City's experience in acquiring lands for the Inwood Hill Park as an illustration of how the municipality often pays for values created by itself.

After having acquired by condemnation proceedings part of the land which is to form the new park, it was decided to enlarge the site. For this additional land a valuation of $5,250,000 has been fixed. To quote *The Sun*:

"If the city had taken the cherry in one bite it would have saved half the amount of the latest award. The lands taken in this proceeding had the advantage of lying alongside of or looking down upon a park, a material value to residential development. Lots in the higher elevations were appraised by the experts for the owners at $6,000 apiece. The city's experts valued them at $2,000 each, trying to divest them of the value they had because of their proximity to the park. The awards are midway between the two prices. The valuations fixed by the Board of Taxes and Assessments for the purposes of taxation were far below these figures. The price the city will pay is two and a half to three times the valuation on which it has been collecting taxes.

"In taking lands for the new court house the city exercised its authority to condemn more land than it needed so that it might enjoy the benefit from a notable improvement in the character of the neighborhood. If the policy of excess condemnation had been adopted in the Inwood Hill Park case, the properties now coming into the city's possession would have cost $2,500,000 less, and if they were not required for the completion of the park they could have been sold at a profit."



A fleet of International Heavy-Duty and "SD" Speed Dump Trucks at Ft. Worth, Texas

International Model "SD"
3000-lb. Speed Dump Truck

HERE is a wonderfully flexible, economical truck for dump and trailer work. There are a hundred uses for this husky International. Ideal for municipal work, general contracting, building material and coal hauling, road and street building, and for general hauling with the two-wheel trailer in place of the dump body.

The 110-inch wheelbase means easy, fast hauling in tight places and the reinforcements throughout mean long life. Special cantilever rear springs and liberal-size radius rods. Enclosed brakes and wide brake drums. Sturdy bevel gear rear axle. That doesn't tell half of it. You'll want to see the "SD" dump truck and its handy brothers—the regular Model S Speed Truck and the underslung, extra-long, extra-low "SL."

The International line includes the Special Delivery, 1-ton and 1½-ton Speed Trucks, Heavy-Duty Trucks ranging from 1½-tons to 5-ton sizes, Motor Coaches for all requirements, and the McCormick-Deering Industrial Tractor. Served by the largest Company-owned truck service organization in the World—we serve your trucks through our 120 branches in the United States and 17 in Canada. Write for complete descriptive literature.

INTERNATIONAL HARVESTER COMPANY
of America
(*Incorporated*)

606 So. Michigan Ave. Chicago, Illinois

INTERNATIONAL
HARVESTER
COMPANY
TRUCKS

The City's Legal Rights and Duties

Conducted by A. L. H. Street, Attorney at Law

A State Held to Have Control Over City Street Which Was Part of State Trunk Highway

The power of a state to assume control over streets constituting parts of state trunk highways was recognized and held to have been exercised, in the case of Automatic Signal Advertising Company vs. Babcock, Commissioner of Highways, 208 Northwestern Reporter, 132, decided by the Minnesota Supreme Court. The plaintiff company unsuccessfully sued to enjoin defendant, a state official, from interfering with the placing of electric warning signs along streets, the same also being used for advertising purposes. That the municipality assented to the erection of these signs did not give plaintiff the right to erect them over the protest of the State Commissioner of Highways, the Court decided, in view of a Minnesota statute which is interpreted as giving the commissioner regulatory powers over state highways within and as well as outside city limits.

A Decision on the Status of Privately Platted Streets and Alleys

Among other rules of fundamental law laid down, the Virginia Special Court of Appeals reached the following stated conclusions in the case of Payne vs. Godwin, 133 Southeastern Reporter, 481:

Platting land into lots, streets, and alleys and selling the lots off with reference to the plat constitutes a dedication of the streets and alleys to public use. Purchasers of the lots become owners of the abutting land constituting the streets and alleys, with a vested right to ingress, egress, light, and air over such lands, subject to proper use of the same as streets and alleys.

Designation of an "alley" on a plat will be taken as a dedication to public use unless a contrary intention is apparent.

That an alley is used by but few persons does not avoid the obligation of the municipality to maintain it as a public way. But the courts cannot compel a municipality to accept dedication of an alley and maintain it for the benefit of the abutting property owner.

Is a Citizen Entitled to Redress on Discontinuance of a Public Utility?

The Mississippi Supreme Court intimates, without expressly so deciding, that a public utility franchise granted by a city may be so worded as to require the holder to respond in damages on suspension or abandonment of service (Mississippi Power & Light Company vs. Maulding, 108 Southern Reporter, 901). The company secured reversal of judgment in favor of plaintiff, a citizen of Jackson, Miss., and award of a new trial, in his suit to recover damages for discontinuance of street-car service on a street upon which his property abutted. The Supreme Court based its reversal on the point that the franchise was not in evidence, saying:

"It not being in evidence, we are unable to see with any precision just exactly what rights were granted and what duties were imposed and what powers were reserved by the city in the way of control. The question as to whether the plaintiff as an abutting property owner has any rights enforceable in this kind of an action is not free from difficulty. It is highly important in determining the question that the Court should be fully advised of the terms of this franchise. So far as we know, it may have authorized the company to discontinue the operation of the street-car service under certain conditions or at pleasure. We are unable to determine what its duties and obligations are, and we cannot take judicial notice of the city ordinance. Again, if the defendant is liable to the abutting property owners for damage, the authority which it gave to the defendant to suspend operation of the street-car service on the streets named does not purport to be a complete abandonment, and the declaration does not show that the city was applied to, to demand the resumption of the operations, and there is nothing to show that the city did permit the permanent abandonment of the street-car operations on said streets. If the abandonment was not permanent, and was not authorized by the city to be permanent, manifestly the defendant could be required to resume operations by the city, and, if it did so, the plaintiff would not be entitled to permanent damages, but only, if liable at all, for damages for the inconvenience and loss incident thereto during the period of the discontinuance."

City Held Liable for Injury Caused by Obstruction Maintained by It on Sidewalk

Affirming judgment against a city for injury to a pedestrian who stumbled over a meter box near a sidewalk curb, in the case of City of Danville vs. Sallie, 131 South Eastern Reporter, 788, the Virginia Special Court of Appeals approved the following declaration made by the Georgia Supreme Court in an earlier case:

"While, of course, in most American cities, water-plugs, telegraph and telephone poles, trees, and other things are allowed upon the margins of sidewalks, and pedestrians, therefore, are not expected to use such portions of the same as are occupied by these obstructions, still there can be no doubt, under the rules of law now settled by repeated adjudications in this and other jurisdictions, that the city authorities must keep in a reasonably safe condition all parts of its sidewalks which are intended to be used by the public. It may often happen that in a particular locality a comparatively narrow portion of a sidewalk, on either side or in the middle of it, is much more generally used than other portions of the same; but this does not relieve the municipal authorities from liability for negligence in permitting dangerous obstructions to be continuously maintained in places upon sidewalks over which the public have a right to pass, merely because those places as not so much used as others." (City Council of Augusta v. Tharpe, 38 S. E. 389, 113 Go. 152.)

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City Not Liable for Negligence in Maintaining Bathing-Beach

A city maintaining a bathing-lake in a park was not liable for injury to a bather, who in diving struck an object in the lake, resulting from negligent maintenance by the city of a dangerous condition, according to the holding of the Georgia Court of Appeals in the case of Jones vs. City of Atlanta, 133 South Eastern Reporter, 521. The fact that the city derived a revenue did not make the city liable, revenue being a mere incident to the main governmental purpose of promoting the health and recreation of the public.

Construction of Comfort Station in Village Street Enjoined Upon Theory That Street May Not Be Used for Purposes Inconsistent with Street Uses

An injunction against construction of a comfort station in a village street was granted by the Ohio Court of Appeals in the case of Sorg vs. Village of Oak Harbor, 151 North Eastern Reporter, 800. The decision recognizes that public use of streets will extend to "new developments in travel, transportation and communication. Such uses, therefore, include the conveyance of electrical energy for light, heat and power, the transmission of messages and information by wire, and the laying of pipes in the street to convey gas for fuel and water for municipal purposes." But, adds the opinion:

"On the other hand, the streets may not be used for public uses which are destructive of or inconsistent with street uses.

"The erection of a comfort station or other building in the street would obstruct travel and transportation, and would be using the street for purposes destructive of and inconsistent with street uses. Therefore the erection of such comfort station would be unlawful."

There Is No Vested Right to Use Streets for Private Business Purposes

Holding that a taxicab operator in Lynchburg had no right to complain against assignment to a competitor of valuable stands in a street, the Virginia Supreme Court of Appeals said in the case of Long's Baggage Transfer Company vs. Burford, 132 South Eastern Reporter, 355:

"The council has absolute control of the streets of the city for the public interest. Every citizen has the common right to travel upon, and transport his property over, them in the ordinary course of business. This right the council may reasonably regulate in the public interest, without undue discrimination, but cannot abrogate it. Persons desiring to use the streets to conduct a transportation business for private gain are on a different footing. No one has the right to conduct such business over the streets of the city without the permission of the municipal authorities. They have the right to grant such privilege to one and refuse another, or withhold it from all. If granted, they have the right to regulate it. Having the right to refuse defendants the privilege to use the streets for the conduct of a transportation business for private gain, it cannot be said that an ordinance under which one of their competitors secured the assignment of private cab stands has deprived defendants of any interest of constitutional right to use the streets of the city."

Under Common Law a City Is Not Liable for Insufficient Fire-Fighting Facilities

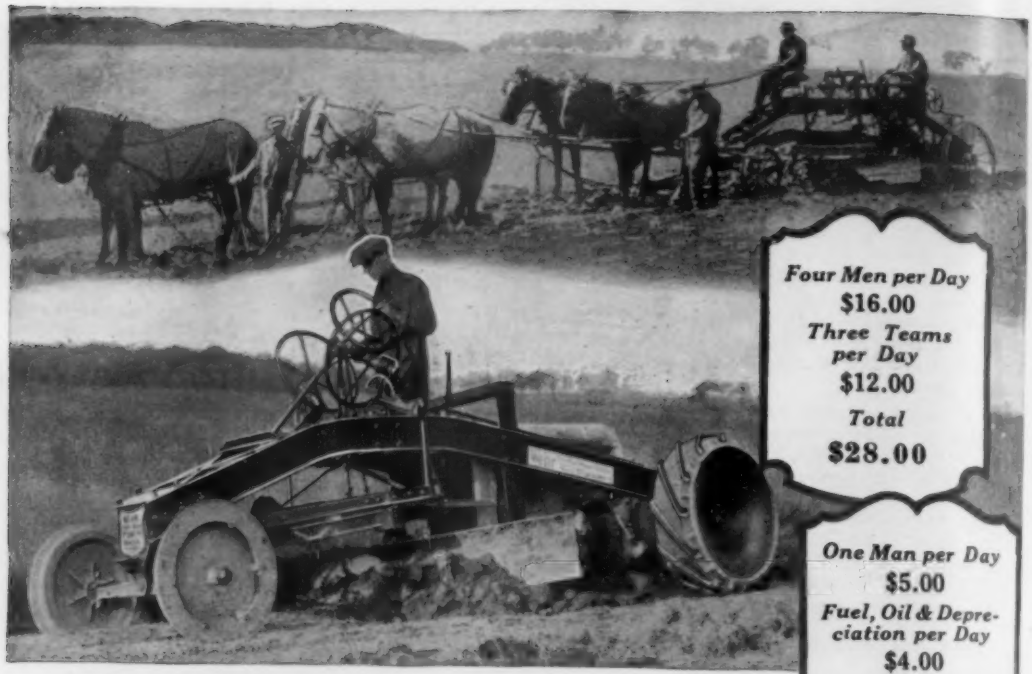
At common law a city or other municipal corporation is not liable to an owner of property within its corporate limits destroyed by fire, on account of negligence of the municipality and its officers in failing to provide suitable fire apparatus or an adequate supply of water with which to extinguish the fires by which such property is consumed. Nor is a water company liable at common law whose only obligation to furnish water with which to extinguish such fires arises out of a contract between it and the city that binds the company to supply the city with water for that purpose. (Indiana Supreme Court, Larimore vs. Indianapolis Water Company, 151 North Eastern Reporter, 333.)

City Not Exempt from Transportation Tax on Materials Used for Construction Purposes

The ever-present controversy as to when a city is amenable to the legal liabilities of individuals or ordinary corporations took a new angle in the case of City of Wichita Falls, Texas, vs. United States, decided by the United States Court of Claims May 17, 1926. The city unsuccessfully sought to recover the amount of transportation tax paid on shipments of sewer pipe, claiming that it was beyond the power of the Federal Government to tax cities in the exercise of their governmental function. The Court of Claims ruled that, while the city did act in a governmental capacity in providing sewerage facilities, the purchase of materials for construction purposes and transportation of the same were in such a purely proprietary capacity that there was no more reason why the city should be exempt from transportation tax than a private individual would be in the same circumstances.

Municipal Liability for Negligence

A comprehensive discussion of this important legal problem, by the Supreme Court of Wyoming, will be found on pages 485 to 488 of this issue.



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Municipal and Civic Publications

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Applied Municipal Sanitation.—By V. M. Ehlers, Chief Sanitary Engineer, E. G. Eggert, Sanitary Engineer, and Ella G. White, Secretary, Division of Sanitary Engineering, State Health Department, Austin, Texas. Published by the Texas Association of Sanitarians, Austin, Texas. 1925. VII + 167 pp. Illustrated. $1.60.

This book embodies the fundamentals of municipal sanitary problems confronting local officials, sanitary workers, public health nurses and students, and is intentionally framed in non-technical language, in the hope of leading the reader on to further study. The subjects considered are: water-supplies and the treatment of water; protection of ice plants; water softening; red water, iron and manganese removal; laboratory control; the grading of water-supplies; sewage disposal; mosquito control; milk sanitation; shellfish protection; camps, park, and swimming pools; problems of general sanitation, including slaughter-houses, food protection, fly control, garbage and refuse disposal. The closing chapter shows what educational activities are available for public health officials in Texas.

The Merit System in Government.—Report of the Conference Committee on the Merit System. Published by the National Municipal League, 261 Broadway, New York. 170 pp. $1.50.

The national committee of eight whose report is contained in this volume is made up of two members designated by the National Municipal League, two by the Governmental Research Conference, two by the National Civil Service Reform League, one by the National Assembly of Civil Service Commissions, and one by the Bureau of Public Personnel Administration. The purpose of the Committee's work was to determine how a public personnel agency should be authorized and organized, what it should do, and what results it should secure when it is properly supported and properly functioning. The report is therefore of great importance to all who are working for, or affected by, changes in civil service methods. The diversity of modern governmental functions is necessitating a great variety of callings among public servants and a constantly increasing public payroll. Seven principal groups of functions of the personnel agency are explained in the report and outlined in Appendix II. Recognizing the diversity of opinion as to the best form of public personnel agency, the Committee describes six principal types and states the advantages and disadvantages attributed to each. Appendix I gives statistical tables as to number of public employees and total payrolls. Appendix III presents a draft of an act to create a public employment commission.

A Study of Motor Vehicle Accidents in the State of Connecticut for the Years 1924 and 1925.—Including a summary of the disciplinary action in motor vehicle cases and a description of the statistical record system developed by the State Department of Motor Vehicles. By Richard Shelton Kirby, Department of Civil Engineering, Yale University; with an Introduction by Robbins B. Stoeckel, Commissioner of Motor Vehicles, State of Connecticut. Published for the Hartley Corporation by the Yale University Press. 34 pp. Graphs. "Motor vehicle accidents will be almost a thing of the past when each individual who uses the highway is not content simply to obey the law, in letter and in spirit, but habitually regards the rights of others more than his own convenience." (Apply to Yale University Press, New Haven, Conn.)

The Connecticut Transportation Survey.—Digest of the Report of a Survey of Transportation on the State Highway System of Connecticut. 10 pp. in the Aug., 1926, issue of *Public Roads*, published by the Bureau of Public Roads, U. S. Department of Agriculture. Tables, maps. The survey was undertaken jointly by the Bureau of Public Roads and the Connecticut State Highway Department as a basis of framing a program to meet the needs for widening and improving old roads and building new ones to accommodate the rapidly increasing traffic. (Apply to the Bureau, Washington, D. C.)

Sources of Revenue of Illinois Cities.—Compiled by A. T. McMaster, Comptroller, Peoria, Ill. 8 pp. of tables in the July-August, 1926, issue of the *Illinois Municipal Review*. Covering 15 cities. 25 cents. (Apply to the Illinois Municipal League, Urbana, Ill.)

Documents Illustrative of American Municipal Government.—Edited by Thomas Harrison Reed, Professor of Municipal Government and Director of the Bureau of Government, University of Michigan; and Paul Webbink, Secretary of the Bureau of Government, University of Michigan. The Century Co., New York. 1926. XIII + 609 pp. $3.50.

This is a source book designed to illustrate the most significant and typical phases and features of the development of municipal government, principally in the United States. It is made up of charters, ordinances, legal decisions, official reports, etc., most of them reprinted only in part, but selected to present everything pertinent to the subject illustrated. The material is arranged under the following divisions: The Beginnings of City Government in the United States; Development of City Government in the United States During the Century Succeeding the American Revolution; The Growth of the Power of the Mayor; The Weak-Mayor Plan of Government; Municipal Rights and Liabilities; Municipal Reform Organizations; The Commission Plan of Government; The Manager Plan; The Development of Nominating and Election Machinery; Proportional Representation; Initiative, Referendum and Recall; The Government of Metropolitan Areas; How the City Conducts Its Business. Special attention is called to the section on the government of metropolitan areas—a new feature in the study of municipal government.

Housing in Philadelphia.—By Bernard J. Newman. Published by the Philadelphia Housing Association, 311 South Juniper Street, Philadelphia, Pa. 60 pp. Illustrated.

This is the report for 1925 of the work of the Philaphia Housing Association, by its Managing Director and Secretary. The material is given under the following divisions: Summary of Housing Progress; Insanitation; Special Surveys; Zoning; Better Housing Movements; Public Education (as to the housing situation). It expresses the great need for constructive efforts to clean up the slums and calls attention to the indifference to adequate inspection that is symptomatic of the situation in the whole field of housing. "The one outstanding feature of housing progress in Philadelphia during 1925 was the phenomenal dwelling construction program, which exceeded any previous year in the history of the city, both in number of houses under permit and in estimated costs."

The City.—Papers and Proceedings of the Twentieth Annual Meeting of the American Sociological Society, held at New York December 29-31, 1925. Published for the Society by the University of Chicago Press, Chicago, Ill. VII + 332 pp. $2.00.

The general theme of the papers given at this meeting is "The City," and the Managing Editor of the volume is E. W. Burgess. Among the papers, under the divisions of Social Psychology, Social Biology, Statistical Sociology, Human Ecology, Regional Planning, Communication, Social Research, and Rural Sociology, are the following of especial interest in the field of The American City: A Redefinition of "City" in Terms of Density of Population, by Walter F. Willcox; American City Birth-Rates, by H. B. Woolston; The Statistical Relation Between Population and the City, by Ernest P. Goodrich; Population Mobility and Community Organization, by LeRoy E. Bowman; Community Participation in City and Regional Planning, by Shelby M. Harrison; The Natural Areas of the City, by Harvey W. Zorbaugh; The Local Community as a Unit in the Planning of Urban Residential Areas, by Clarence Arthur Perry; The Research Resources of a Typical American City as Exemplified by the City of Buffalo.

The Trend of Governmental Costs.—By C. E. Rightor, Chief Accountant, Detroit Bureau of Governmental Research, Inc., Detroit, Mich. Reprinted from the *City Manager Magazine*, August, 1926. 4 pp. Based upon a study of the Financial Statistics of Cities for 1923, published by the U. S. Bureau of the Census, the statement is made that the expenses for general operation in 146 cities increased 166 per cent in 20 years on account of the demand for new and improved service, and suggestions are made by the author for economy and effectiveness in government. (Apply to the author.)

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Curing the Criminal.—By Jesse O. Stutsman, General Superintendent of Rockview Penitentiary, Bellefonte, Pa. The Macmillan Company, New York. 1926. VIII + 419 pp. $2.50.

A treatise on the philosophy and practices of modern correctional methods. The author's long experience in correctional work entitles him to attention in the presentation of his theory for the protection of society from the criminal and the elimination of crime. He believes in the coordination of all means to this end, and in the necessity of individual treatment of criminals. "Every state differs from every other state in its laws and methods of combating crime. . . . No forceful leader has yet arisen capable of sifting out the best to be found in every state and digesting the whole into a composite standard for all to pattern." Among the phases of the discussion are the following: an interesting study of the transition of prison architecture; penal farm management; prison industries and the compensation of prisoners; education of the criminal; self-government of prisoners; the personality of the criminal and its diagnosis, the police as a deterrent agency; the death penalty; probation and parole. An extensive bibliography is given. In the conclusion the successful work of the Board of Public Welfare in Kansas City is outlined, also the New Jersey plan for centralization of responsibility for the management of public charitable and correctional institutions. The value of local crime commissions and of a national crime commission is emphasized.

Jimmie and the Junior Safety Council.—By Stella Boothe. World Book Company, Yonkers-on-Hudson, N. Y. 1926. IX +246 pp. $1.20.

Through the dramatic quality of safety problems has been evolved a method of educating children to deal with these problems courageously. This book tells in a most interesting way how some normal children gained the information and the experience that gave them a sense of responsibility for human life and safety. The very enlivening stories present the various ways in which danger may occur, and show how the practice of safety may become a natural part of the activities of childhood. The forming and conducting of a Junior Safety Council is the framework of the book, and many of the incidents are taken from newspapers and school reports. The volume also includes a Handbook of Safety Instruction covering 50 pages and designed for the use of pupils.

Chamber of Commerce Income and Support.—Published by the National Association of Commercial Organization Secretaries, as of March 1, 1926. Handy size. 51 pp. A classification, by cities and by businesses, of the information received from 350 chamber of commerce secretaries as to the financial basis of their organizations. The cities are also classified as to population, so as to permit comparisons between cities of similar size. Published July 15, 1926. 25 cents. (Apply to Walter O. Lochner, Secretary-Treasurer of the Association, Chamber of Commerce, Trenton, N. J.)

Citizenship Games and Devices.—By Myra King. Los Angeles, Calif. Published by the Gem Publishing Company, 336 South Broadway, Los Angeles, Calif. 1926. 96 pp. The author is a teacher who has put into practice the suggestions given in her book for teaching public courtesy and etiquette. Each left-hand page contains a suggestion for emphasizing some particular phase of this instruction, and the right-hand pages are left blank for written notes. The successive phases of the lessons are: Seeing Kind Things; Doing Kind Things; Who Are Public Servants?; Right Attitude Toward Public Servants; The Policeman and Right Attitude Toward Law; Voting and Right Attitude Toward Law; Helping the Policeman; Helping the Street-Sweeper; Street-Car Manners; Etiquette in Public Meetings; Right Attitude Toward Age and Experience and Public Benefactors; Always Something to Be Learned; Preservation of Old Landmarks; Mutual Dependence or Brotherhood. $1.25. (Apply to the publishers.)

Primary or Party Convention.—Arguments for and against the proposed amendment to the Ohio constitution. In *Greater Cleveland* for September 15, 1926, 6 pp. The argument for the amendment is made by Harry L. Davis, former Governor of Ohio; that against the amendment by Wm. B. Woods, Chairman of the Election Law Committee of the Citizens League of Cleveland. (Apply to the League, 1307 Swetland Building, Cleveland, Ohio.)

Recommendations of the Anti-Fire Waste Committee of the Chamber of Commerce, Lawrence, Mass.—A statement of the fire hazards in Lawrence and of what can be done, at small expense, to avoid a conflagration in the business and tenement districts. August 23, 1926. 11 pp. (Apply to Walter M. Hastings, Chairman of the Committee.)

Community Drama.—Prepared by the Playground and Recreation Association of America. Published by The Century Co., New York. 1926. XI + 240 pp. Illustrated. $2.00.

A practical book for those who are interested in producing drama with community groups. It is a valuable aid, not only for the inexperienced, but also for those who are already leaders in this important field of recreation and education. The details of play production are given in the first chapter, which is followed by one on organizing dramatic work for children. Festivals, masques, pageants, religious drama, and recreational dramatics are all practically dealt with. A very important chapter is that on Organization for Community Drama. Full programs for special days are given, making this a handbook in its field. The descriptive bibliography of plays is a very important feature of the book.

American Villagers.—By C. Luther Fry. George H. Doran Company, New York. 1926. XV + 201 pp. $2.50.

The Institute of School and Religious Research has made an elaborate study of agricultural villages as to their social, religious, and economic conditions. In addition to the field studies which this investigation has involved, the Institute has gathered important published material about villages and has also examined hitherto unpublished village data in the files of the Census Bureau. The results of this latter portion of the work are given in the present volume and are solely the work of Dr. Fry, who is the Director of the Bureau of Standards of the Institute and Associate Director of the American Village Study. The material is statistical, but of vital interest. It tells how many villagers there are and whether their number is decreasing; what kind of people they are and what they do for a living; what their distinguishing peculiarities are and what service they are equipped to perform in the fields of education, religion, law, and health. About 177 villages are covered. The data have already been published in the Institute publication, "A Census Analysis of American Villages," and the primary purpose of Dr. Fry's present book is to interpret their significance. The village is shown to be an increasingly important part of the "rural" population.

Forum Meetings.—By the Secretary of the Urbana [Ill.] Association of Commerce. The result of a questionnaire to which 50 or more secretaries of chambers of commerce replied. The facts are effectively analyzed and bring out the matter of cooperation between luncheon clubs and commercial organizations. A tabular statement of frequency and time of meetings, advance sale of tickets, and prices of tickets, in various cities, is given; also lists of forum topics reported, subjects suggested, and speakers recommended. (Apply to Urbana Association of Commerce, Urbana, Ill.)

Rural Water Supplies May Appear Deceptively Pure.—By Jack J. Hinman, Jr., Associate Professor of Sanitation, University of Iowa; and Chief, Water Laboratory Division, State Hygienic Laboratories, Iowa City, Iowa. 3 pp. reprinted from *The Nation's Health*, July, 1926. Illustrated. Showing that the drinking of untreated surface waters is nowhere absolutely safe, and that while water from the ground or cistern is apt to be sanitary, all possible precautions must be taken to maintain its quality. (Apply to the author.)

Types of Architecture Approved for Palos Verdes Estates.—The *Bulletin* of the Palos Verdes Art Jury for May, 1926, 8 quarto pp., giving illustrations of specimens of three types of architecture approved by the Jury, stating the general requirements as to architecture for that development, and defining the types. (Apply to Building Commissioner, 75 Malaga Cove Plaza, Palos Verdes Estates, Calif.)

Report on State Laws and Municipal Ordinances Providing That Subdivisions of Large Tracts of Land Shall Not Be Accepted, Approved or Recorded by Public Officials Unless in Such Subdivisions Reservations Are Made for Public Parks, Playgrounds and Similar Recreational Purposes.—Prepared at the request of Hon. Jacob M. Arvey, Chairman, Committee on Judiciary, Chicago City Counsel, by Frederick Rex, Librarian, Municipal Reference Library, Chicago, Ill. August, 1926. 13 mimeographed pp. (Apply to the Municipal Reference Library, 1005 City Hall, Chicago, Ill.)

New York State Safety Congress.—Proceedings of the Congress held in Albany, March 11, 12 and 13, 1926, under the auspices of the Bureau of Motor Vehicles. 126 pp. Contains a number of interesting and valuable papers on the different phases of securing highway safety. (Apply to the State Bureau of Motor Vehicles, Albany, N. Y.)

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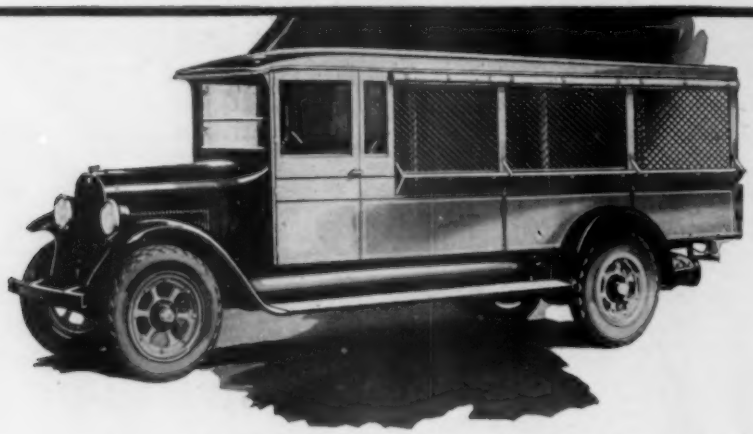

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Stream Pollution.—Reprint from the *Public Health Reports* of the United States Public Health Service for Jan. 15, Feb. 5, 12, and 19, 1926. 51 pp. Tables, graphs. Containing the following papers by officers of the Service: A Review of the Work of the United States Public Health Service in Investigations of Stream Pollution, by W. H. Frost, Surgeon; The Rate of Deoxygenation of Polluted Waters, by Emery J. Theriault, Associate Chemist; The Rate of Atmospheric Reaeration of Sewage-polluted Streams, by H. W. Streeter, Sanitary Engineer; and Quantitative Studies of Bacterial Pollution and Natural Purification in the Ohio and the Illinois Rivers, by J. K. Hoskins. 10 cents. (Apply to Government Printing Office, Washington, D. C.)

Der Ruhrverband.—By Dr. Ing. K. Imhoff, Essen, June, 1926. A pamphlet of 48 quarto pp., with tables and illustrations, describing, in German, the development of the Ruhr District from the standpoint of sewage disposal and water purification. Illustrated. Folding map of the District. Paper covers, 3 marks. (Apply to Verlag Wasser, Brummerstrasse 48, Berlin-Dahlem, Germany.)

Ohio Conference on Water Purification.—Fifth Annual Report of the Conference held at Akron, Ohio, October 15-16, 1925. Published by the Ohio State Department of Health. At this meeting 59 of the 70 municipalities included in the Conference were represented. Original papers and reports of special committees on various phases of water purification are presented in this pamphlet. 85 pp. (Apply to the State Department of Health, Akron, Ohio.)

Nineteenth Paris Prize in Architecture—"A Natatorium in a Park."—In the August, 1926, issue of the *Bulletin* of the Beaux-Arts Institute of Design, 126 East 75th Street, New York. Set of drawings presenting the winning design, made by C. E. Landefeld, in the final competition for the Nineteenth Paris Prize of the Society of Beaux-Arts Architects. The plan is on a magnificent scale, for a city that lies in a valley in the foothills of a mountain range. In providing a place of recreation for the entire year it includes: a great building to contain a large indoor swimming pool and its services; a mammoth outdoor pool for swimming in summer and skating in winter; a park and playground for the enjoyment of the citizens at all seasons. (Apply to the publication.)

Elementary Americanism.—By F. A. Baughan. Published by the Gem Publishing Company, Los Angeles, Calif. 1926. V + 139 pp. Illustrated. With the idea of helping the Americanization work of patriotic associations and of educating the people in the fundamentals of patriotism, this little volume has been prepared. It contains brief histories of the Declaration of Independence, the Constitution of the United States, and the United States flag and its code, with the text of each. The origins of the common, legal, public, and special holidays are given, and their observance explained. $1.25. (Apply to the publishers.)

Town and Village Planning.—Published by the Niagara Frontier Planning Association, Tonawanda, N. Y. 1926. 10 pp. The Association was formed in 1924 and sponsored the creation, in 1925, of the Niagara Frontier Planning Board. The Association functions as the promotion and publicity arm of the movement, while the Board maintains the necessary engineering staff and contact with the constitutional authorities. This pamphlet is designed to stimulate the formation of local planning committees to work for the development of their communities in coordination with all the others. It includes digests of the New York State laws authorizing the creation of planning and zoning bodies. (Apply to the Association, at 37 Main Street, Tonawanda, N. Y.)

Harmon Foundation Year Book, 1924-1926.—Published by the Harmon Foundation, Incorporated, 140 Nassau Street, New York. June, 1926. A report of progress, an appraisement of the work of the Foundation, and an offer of service. Covering the following divisions: Playgrounds; Student Loans; Awards for Constructive and Creative Achievement; Social Research and Experimentation. Illustrated. 79 pp. Containing reports of specific playground development in many municipalities. (Apply to the Foundation.)

Educational Opportunities of Greater Boston.—Day and evening courses for working men and women. Catalog No. 4 (1926-1927), compiled by the Prospect Union Educational Exchange, conducted by the Prospect Union Association of Cambridge, 760 Massachusetts Avenue, Cambridge, Mass., of which James Ford is President. The courses listed are of great variety and are those offered by Boston schools which give evidence of serious educational purpose and which are open to working men and women who have not yet completed high school work or its equivalent. 140 pp. 50 cents. (Apply to the Association.)

Politics and the Public Health.—By James A. Tobey. Reprinted from *The Scientific Monthly* for August, 1926. 6 pp. An important paper dealing with the difficulty of securing properly trained sanitarians to serve as public health officers, on account of the inadequacy of compensation, the insecurity of tenure, and the hampering power of partisan politics. (Apply to the author, 350 Madison Avenue, New York.)

The Geodetic and Topographic Survey of Pittsburgh and Allegheny County.—By U. N. Arthur, Chief Engineer, Department of City Planning, Pittsburgh, Pa. Published by the Engineers' Society of Western Pennsylvania, William Penn Hotel, Pittsburgh, Pa. Read before the Society December 15, 1925, and reprinted from Volume 42, of the Proceedings. 48 pp. This survey is fundamental, lasting, comprehensive, accurate, and capable of indefinite expansion as the future needs of the district may require. (Apply to the Society.)

Sanitary Arrangements in American Public Recreation Buildings.—By Guy Wilfrid Hayler. Excerpt from Vol. XLVI, No. 18 (1926) of the *Journal of The Royal Sanitary Institute*. 6 pp., with folding diagram of Fuller Park Field House, South Park Commission, Chicago. Describing in detail the sanitary arrangements in a typical park field house in Chicago. The author was for some time with the Engineering Department of the South Park Commissioners. (Apply to the author, 803 Phelan Building, San Francisco, Calif.)

Cost of Primaries and Elections in Maine.—By Orren Chalmer Hormell, Ph.D., Professor of Government, Bowdoin College. *Bowdoin College Bulletin*, July, 1926. Municipal Research Series No. 6. 61 pp. Tables. This study has special reference to the year 1924 and shows the cost of the primary and of the election to candidates, party committees, cities and towns, and the state. Expenditures are classified by offices, counties, and objects of expenditure. The moneys spent by party committees, with the objects of the expenditures, are also given. (Apply to Bowdoin College, Brunswick, Me.)

Enlarge Manhattan Nine Square Miles by Extending It Southward.—"The New Land Will Be Worth $3,750,000,000 and Its Buildings $11,250,000—Would Not Cost the City, States or Nation a Dollar, New York City Could Own It in 50 Years, and Leave the Entire New Manhattan Free of All Debt." Reprinted from *The Port of New York* for August, 1926. 4 quarto pp. Illustrated. The originator of this plan for extension is T. Kennard Thomson, consulting engineer, New York. (Apply to Mr. Thomson, Engineer's Club, 32 West 40th Street, New York.)

Committee of the Permanent Charity Fund Incorporated, Boston, Mass.—Ninth Year Book, covering the activities of the Committee and of the Permanent Charity Fund of the Boston Safe Deposit and Trust Company, Trustee, for the year ending June 30, 1926. 42 pp. (Apply to Charles M. Rogerson, Secretary of the Committee, 100 Franklin Street, Boston, Mass.)

Reports Received

BURLINGTON, VT.—Illustrated pamphlet showing the equipment, apparatus and service of the Department

CHICAGO, ILL.—Annual Financial Report, Board of Education, 1925

CHICAGO, ILL.—A Report of the Expenditures of Bond Issue Funds Provided During the Years 1922, 1924, and 1925 for the Extension and Rehabilitation of the Municipal Electric Street Lighting System, Department of Gas and Electricity

CHICAGO, ILL.—Annual Report, Department of Public Welfare, 1925

CHICAGO, ILL.—Annual Report, Police Department, 1925

CHICAGO, ILL.—Municipal Code of the South Park Commissioners, March 13, 1923, as subsequently amended, December 16, 1925

CHICAGO, ILL.—General Ordinances of the West Chicago Park Commissioners Relating to Motor Vehicles and Penalties for Violation Thereof, 1925

FITCHBURG, MASS.—Annual Report, Commissioner of Public Works, 1925

KANSAS CITY, MO.—Annual Report, Fire Department, year ending April 20, 1925

LYNCHBURG, VA.—Annual Report of the City, year ending January 31, 1926

MONTCLAIR, N. J.—Annual Report, Board of Health, 1925

MOOSE JAW, SASK.—Financial Statement, 1925

ORANGE, N. J.—Report of the Milk Inspection Association of the Oranges, 1924-1925

NEW ORLEANS, LA.—Semi-Annual Report, Sewerage and Water Board, December 31, 1925

NEW YORK CITY.—Annual Report, Chief Engineer, Board of Estimate and Apportionment, 1924

SEATTLE, WASH.—Annual Report, Department of Lighting, 1915

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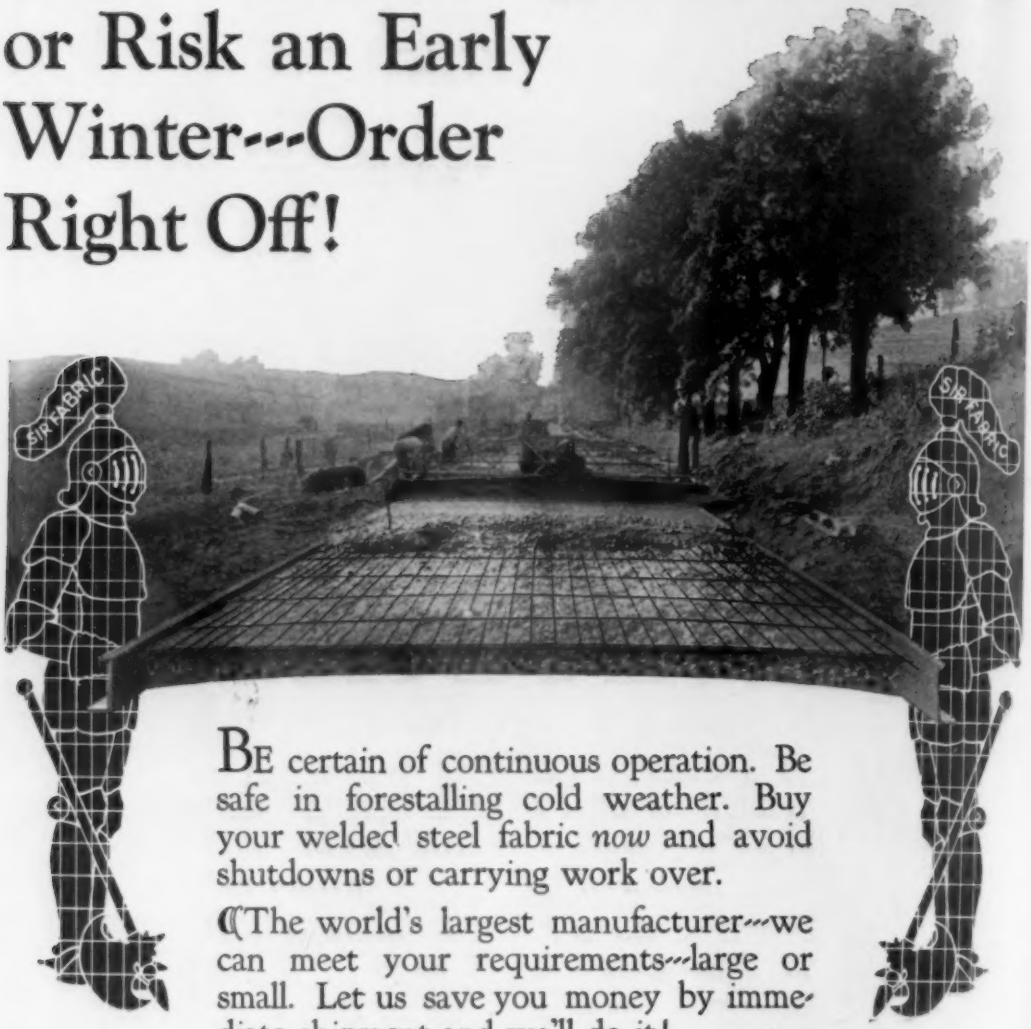

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NEW YORK CITY, N. Y., 726 Ligget Bldg., 41 East 42nd St.
PHILADELPHIA, PA., 1201 Franklin Trust Bldg.
PITTSBURGH, PA., Union Trust Bldg.
PORTLAND, ORE., 350 E. Ankeny St.
ROCHESTER, N. Y., 411 Commerce Bldg.
SAN ANTONIO, TEXAS, 501 Builders Exchange Building
SAN FRANCISCO, CALIF., 274 Brannan Street
709
ST. LOUIS, MO., 1916 Railway Exchange Building
SEATTLE, WASH., 2700 Westlake Ave., N.

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On the Calendar of Conventions

OCTOBER 4-7.—WASHINGTON, D. C.
American Red Cross. Annual meeting. Secretary, Mabel T. Boardman, National Headquarters, Washington, D. C.

OCTOBER 4-7.—WASHINGTON, D. C.
National Tuberculosis Association. Annual meeting. Executive Secretary, Frederick D. Hopkins, 370 Seventh Avenue, New York.

OCTOBER 4-8.—CLEVELAND, OHIO
American Electric Railway Association. Annual convenion and Manufacturers' Exhibit. Executive Secretary, J. W. Welsh, 292 Madison Avenue, New York.

OCTOBER 4-8.—ATLANTIC CITY, N. J.
Special Libraries Association. Annual meeting. Secretary, Gertrude Peterkin, American Telephone and Telegraph Company Library, 195 Broadway, New York.

OCTOBER 4-9.—ATLANTIC CITY, N. J.; PHILADELPHIA, PA.
American Library Association. Annual conference. Executive Secretary, Carl H. Milam, 86 East Randolph, Chicago, Ill.

OCTOBER 5-6.—FARMVILLE, VA.
League of Virginia Municipalities. Annual convention. Secretary, Morton L. Wallerstein, 408 Travelers Building, Richmond, Va.

OCTOBER 4-9.—PHILADELPHIA, PA.
American Society of Civil Engineers. Fall meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

OCTOBER 7-15.—SAN FRANCISCO, CALIF.
All-Western Road Show. Address: P. H. Curtis, Manager, 625 Market Street, San Francisco, Calif.

OCTOBER 8.—MEMPHIS, TENN.
Association of American Cemetery Superintendents. Annual convention. Secretary, W. B. Jones, Highwood Cemetery, Pittsburgh, Pa.

OCTOBER 11-14.—BUFFALO, N. Y.
American Public Health Association. Annual meeting. Secretary, Homer N. Calver, 370 Seventh Avenue, New York.

OCTOBER 11-15.—SHREVEPORT, LA.
Southwest Water Works Association. Annual meeting. Secretary, R D. Morgan, Box 586, Mexia, Texas.

OCTOBER 15-21.—PITTSBURGH, PA.
American Prison Association. Annual convention. General Secretary, E. R. Cass, 135 East 15th Street, New York.

OCTOBER 18-20.—NEWTON, KANS.
League of Kansas Municipalities. Annual convention. Secretary-Treasurer, John G. Stutz, University of Kansas, Lawrence, Kans.

OCTOBER 18-21.—NORFOLK, VA.
American Association of Port Authorities. Annual convention. Secretary, Tiley S. McChesney, Room 200, Court Building, New Orleans, La.

OCTOBER 18-22.—ATLANTIC CITY, N. J.
Playground and Recreation Association of America. Annual Recreation Congress. Secretary, H. S. Braucher, 315 Fourth Avenue, New York.

OCTOBER 19-20.—SALEM, MASS.
Massachusetts Federation of Planning Boards. Annual conference. Executive Secretary, Edward T. Hartman, 37 State House, Boston, Mass.

OCTOBER 19-22.—NEW ORLEANS, LA.
International Association of Fire Engineers. Annual convention. Secretary, James J. Mulcahey, City Hall, Yonkers, N. Y.

OCTOBER 22.—DAVENPORT, IOWA
Iowa Association of Commercial Organization Secretaries. Annual meeting. Secretary, G. B. Eastburn, Marshalltown, Iowa.

OCTOBER 24-27.—PITTSBURGH, PA.
National Association of Commercial Organization Secretaries. Annual meeting. Secretary-Treasurer, Walter O. Lochner, Chamber of Commerce, Trenton, N. J.

OCTOBER 25-27.—PHILADELPHIA, PA.
International Association of Dairy and Milk Inspectors. Annual convention. Secretary-Treasurer, Ivan C. Weld, Pennsylvania Avenue at 26th Street, Washington, D. C.

OCTOBER 25-26.—HOUSTON, TEXAS
American Institute of Park Executives. Annual convention. Executive Secretary, Will O. Doolittle, Box 422, Tulsa, Okla.

OCTOBER 25-29.—DETROIT, MICH.
National Safety Council. Annual Safety Congress. Managing Director, W. H. Cameron, 108 East Ohio Street, Chicago, Ill.

OCTOBER 26-30.—WHITE SULPHUR SPRINGS, W. VA.
American Institute of Steel Construction. Annual convention. Executive Director, Charles F. Abbott, 285 Madison Avenue, New York.

NOVEMBER 3-5.—ST. LOUIS, MO.
American Water Works Association, Iowa Section (including Iowa, Missouri, Nebraska, and South Dakota). Annual convention. Secretary, Jack J. Hinman, Jr., University of Iowa, Iowa City, Iowa.

NOVEMBER 8-10.—ST. LOUIS, MO.
National Municipal League. Annual convention. Secretary, H. W. Dodds, 261 Broadway, New York.

NOVEMBER 8-12.—PINEHURST, N. C.
American Association of State Highway Officials. Annual meeting. Executive Secretary, W. C. Markham, 638 Munsey Building, Washington, D. C.

NOVEMBER 8-12.—WASHINGTON, D. C.
American Society for Municipal Improvements. Annual convention. Secretary, C. W. S. Sammelman, 3817 Olive Street, St. Louis, Mo.

NOVEMBER 8-12.—WASHINGTON, D. C.
Asphalt Association. Annual Asphalt Paving Conference. Secretary, J. E. Pennybacker, 441 Lexington Avenue, New York.

NOVEMBER 9.—ASHEVILLE, N. C.
National Association of Railroad and Utilties Commissioners. Annual convention. Secretary, James B. Walker, 270 Madison Avenue, New York.

NOVEMBER 10-11.—ST. LOUIS, MO.
American Municipal Association. Annual meeting. Executive Secretary, John G. Stutz, Lawrence, Kans.

NOVEMBER 10-14.—WASHINGTON, D. C.
American Country Life Association. Annual conference. Secretary, Henry Israel, Room 1849, Grand Central Terminal Building, New York.

NOVEMBER 15-19.—PHILADELPHIA, PA.
National Tax Association. Annual meeting. Secretary, Alfred E. Holcomb, 195 Broadway, New York.

NOVEMBER 18-19.—TORONTO, ONT.
Ontario Associated Boards of Trade and Chambers of Commerce. Annual meeting. Secretary, T. Marshall, Royal Bank Building, Toronto, Ont.

NOVEMBER 18-20.—FRESNO, CALIF.
California Municipal Traffic League. Conference on Uniform Traffic Regulation. Secretary, William J. Locke, Alameda, Calif.

NOVEMBER 22-23.—ST. LOUIS, MO.
Mississippi Valley Association. Annual meeting. Director of Publicity, R. M. Johnson, Chamber of Commerce Building, St. Louis, Mo.

NOVEMBER 30-DECEMBER 2.—ST. BONIFACE, MAN.
Union of Manitoba Municipalities. Annual convention. Secretary, D. D. McDonald, Dauphin, Man.

DECEMBER 2-4.—LOUISVILLE, KY.
American Vocational Association. Annual convention. Secretary, Z. M. Smith, State Director of Vocational Education, Indianapolis, Ind.

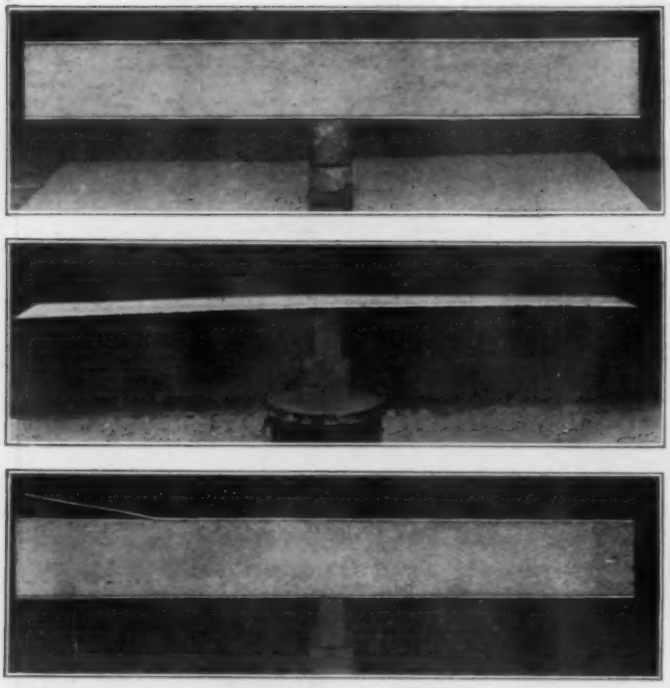
DECEMBER 6-9.—NEW YORK
American Society of Mechanical Engineers. Annual meeting. Secretary, Calvin W. Rice, 29 West 39th Street, New York.

DECEMBER 8-9.—WASHINGTON, D. C.
National Rivers and Harbors Congress. Annual convention. Secretary, S. A. Thompson, 824 Colorado Building, Washington, D. C.

DECEMBER 28-31.—ST. LOUIS, MO.
American Sociological Society. Annual meeting. Secretary, E. W. Burgess, Faculty Exchange, University of Chicago, Chicago, Ill.

DECEMBER 28-31.—ST. LOUIS, MO.
National Community Center Association. Annual meeting. Secretary, LeRoy E. Bowman, 503 Kent Hall, Columbia University, New York.

JANUARY 10-14.—CHICAGO, ILL.
American Road Builders' Association. Annual convention and Road Show. Secretary, Ethel A. Birchland, 37 West 39th Street, New York.



The top and center views illustrate the stability of the new Servicised Metal Edge Expansion Joint. The joint, five foot in length, was supported on edge and on its flat surface, only at the center, for one hour at a temperature of 90 degrees Fahr. and in neither instance does it show signs of collapse or distortion of any kind. The lower view shows the ease with which the upper metal strip can be peeled off.

And Now—

The Perfect Joint—

No more wavy, irregular and unsightly black bands across a white ribbon of highway—the day of the non-functioning, easily disintegrated expansion joint is past.

A joint that cannot flop out of alignment, that cannot ooze out of position and wear away, that resists all pebbles or other foreign substances, that has genuine plasticity and resiliency so that it actually functions when the slabs contract or expand, that is easily and accurately installed—here is the new Servicised Metal Edge Expansion Joint, the joint of perfect qualities.

It does not run in hot weather, does not adhere when crated, is non-brittle in winter. Heat does not make it expand, stretch or distort—the metal edge absolutely prevents a wavy condition.

Installed With Ease

The Servicised Metal Edge Expansion Joint has sufficient rigidity to eliminate the use of a backing board in installation. The metal strip at the base of the joint remains in the pavement permanently, preventing flaring of the base but in no way interfering with the functioning of the joint. It prevents distortion and insures constant contact between base and subgrade, thereby eliminating any possibility of the slabs uniting.

The metal strip on the surface edge assures perfect alignment during installation and is readily removed when the joint is in place. It peels off as easily as a banana skin.

This new Metal Edge Joint speeds up installation, guarantees accurate results and is a permanent, functioning unit in the pavement.

Write us today or see our nearest dealer for full information and prices on this new, perfect Expansion Joint

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CHICAGO, ILLINOIS

SERVICISED EXPANSION JOINTS

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News and Illustrations

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

An Improved Electric Flow-Meter

With the great advancement which has taken place in engineering practice, realization of the importance of making systematic and accurate measurements of the conditions and quantities involved has grown rapidly. At the same time, the desirability of locating the meters at points of greatest convenience to the users is more keenly appreciated today than ever before. An example of this trend is supplied by the popularity of flow-meters of the electrically operated type, by the use of which an indicator may be located in the clear view of a boiler fireman as a guide to firing, in the view of a sewage-plant operator, showing flows in various parts of a large activated sludge plant, and in the office of the superintendent of a filtration plant showing conditions at some distance from the central recording point.

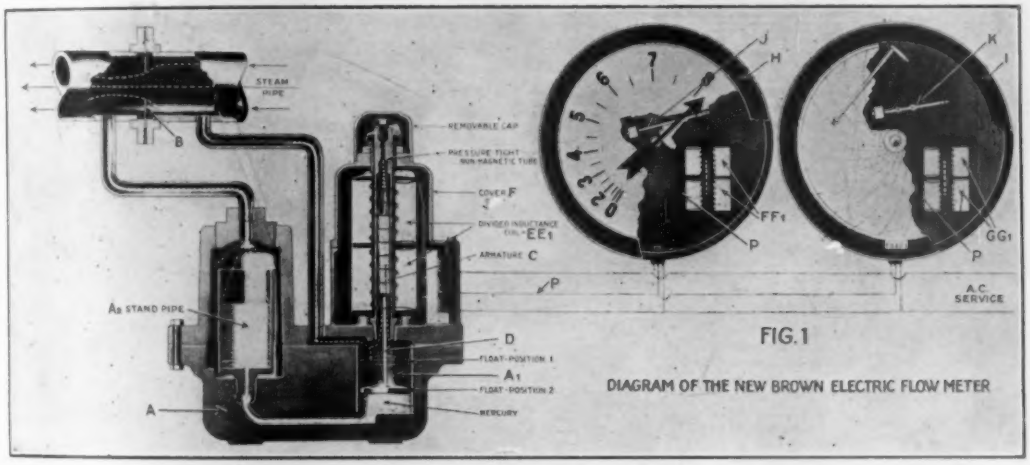

FIG. 1

DIAGRAM OF THE NEW BROWN ELECTRIC FLOW METER

Electrical operation is advantageous for flow-meters, since it afforded a means of producing external indications and records of conditions existing inside a pipe without transmission of mechanical motion. Because of these considerations, the Brown Instrument Company, Philadelphia, Pa., is offering a new electrically operated flow-meter which, by a novel but practical utilization of a well-known electrical principle, at one stroke aims to avoid practically all electrical as well as mechanical difficulties previously encountered in flow-meters.

Among the characteristics of this new line of Brown instruments are the following: The readings of the instrument are fundamentally independent of the value of the voltage impressed upon the electrical system; the instrument reads correctly while operating on varying line voltages without the use of either voltage regulators or compensators; the electrical circuits at the manometer, indicator, and recorder consist simply of stationary, divided, inductance coils, which have only three connections, permanently made at the time of installation; there are no make and break contacts, such as contacts dipping into mercury within the pressure chamber, voltage regulator contacts, or similar devices and in the manometer or meter body, all electrical windings and connections are entirely external to the pressure chamber.

The integrator is a mechanical device operated by the electric clock which drives the charts. An equal amount of power is available for operating the integrator at all rates of flow, making possible the use of the most easily read type of 5-figure counter for the integrator. A pen operated by the action of the integrator mechanism makes the record at the outer edge of the chart each time the integrator mechanism increases the counter reading by one unit. Each tenth mark is made distinguishable from the intermediate marks in order to facilitate counting when it is desirable to determine the total flow for the day or during any hours of the day without having to watch the counter. The entire integrator mechanism with its individual recording pen is so simple and compact that it can be mounted in the standard recorder case along with the recording mechanism, thus avoiding the necessity of a separate integrator case.

The principle of operation of the new Brown electric flow-meter is shown in Figure 1. Manometer A operates in response to differential pressure caused by the flow of fluid through the orifice B. When the rate of flow increases, the mercury is depressed in chamber A1 and rises in chamber A2, the difference in mercury level in the two chambers being a measure of the rate of fluid flow through the orifice in accordance with well-known principles. When the flow increases

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Cleveland, Ohio.

Gentlemen;

Enclosed find photos of our fleet of trucks now being operated by us.

We have our fleet exclusively on Kelly Cater-pillar solids and Kelly Aircore Cushion type tires, which speaks for itself as to our opinion of your tires.

We have had absolute satisfaction with these tires and will continue having Kellys on our trucks as long as their present high quality is maintained.

We must have maximum traction coupled with mileage and surely must say we are obtaining these in Kellys.

Very truly yours,

THE BUILDERS SUPPLY CO.

BY: Raymond A. Klein

KELLY-SPRINGFIELD TIRES

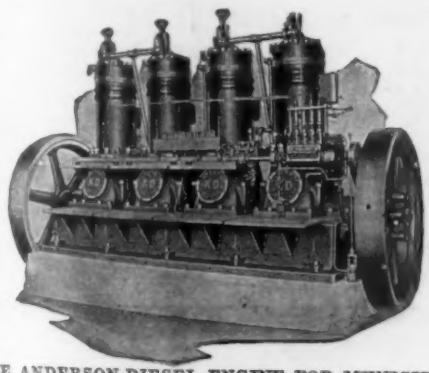
from zero to a maximum value, a float which rides on the mercury surface in chamber A1 is lowered from the position indicated by the dotted line to a lower position, as indicated by the solid line. An armature C of transformer iron is supported by the float on a non-magnetic rod D and the armature is raised and lowered in accordance with the motion of the float. The armature travels inside a rust-proof non-magnetic tube which has high electrical resistance and great mechanical strength. The pressure of the fluid being metered is confined within this tube, and the electrical inductive winding EE1, which is slipped over the outside of the tube, has magnetic linkage with the armature which moves inside. At the same time the coil is under atmospheric conditions only and is protected by a cover F.

The outer ends of the divided winding EE1 are connected directly across the service-mains of an alternating-current supply line, and connections are run from these ends directly to the outer end of a similar divided inductance coil FF1, which operates indicator H, and also to divided inductance coil GG1 operating recording instrument L. Armatures are hung on counterbalanced arms J and K in the two instruments. The points of connectoin between the two parts of divided coils EE1, FF1, and GG1 are all connected by a natural wire P, and when thus connected coils form the self-adjusting inductance bridge which is the outstanding basic feature of this flow-meter.

When the armature in the manometer is raised or lowered by a change in fluid flow the relation between the voltage across the two parts E and E1 of the winding will be changed. This causes the currents in the two parts FF1 of the indicator coil, and also the currents in the two parts GG1 of the recorder coil, to become unequal. As a result, the armatures of the indicator and recorder move to new positions corresponding to the position of the armature C, and the meter readings are adjusted accordingly by means of the gearing or linkage shown.

Simplified Heavy-Duty Diesel Engines

The Anderson Type KD heavy-duty diesel engine, made by the Anderson Engine and Foundry Company, Anderson, Ind., is of two-cycle cold-starting mechanical injection type. Every upward movement of the pistons draws the crank-case full of air. The air is then compressed therein by the next down-stroke until the inlet port is uncovered by the piston, at which time the compressed air is transferred from the crank-case to the cylinder on the well-known two-cycle principle. This engine is an automatic unit sufficiently simple to be operated by the average user, can be lubricated economically, operates steadily without massive foundations, works well in hot or cold climate and burns any fuel which any engine of this type can successfully use.



THE ANDERSON DIESEL ENGINE FOR MUNICIPAL POWER-PLANTS

To insure long life the parts of the Anderson diesel engine run unusually slowly and all engines are tested at considerable overload and conservatively rated for 1,000-foot altitudes. The governor and fuel injection is such that a change of speed may be obtained at any time desired while the engine is in operation. Rotation may be in either direction and can be changed at any time by a simple adjustment requiring but a few minutes. This up-to-date prime mover is built upon proved principles and is in successful operation in municipal electric light and power plants and water-works. It is made in horsepowers ranging from 50 to 360.

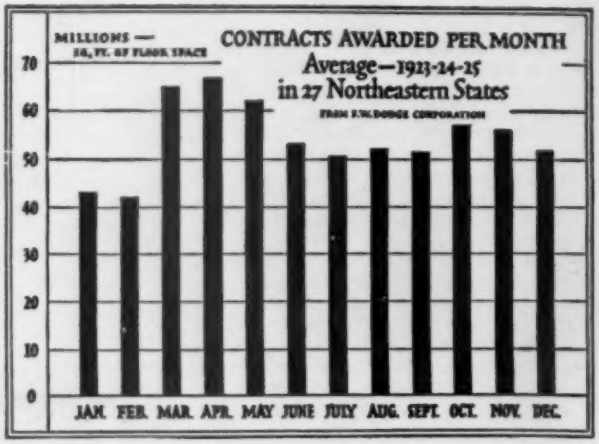
THE NEW MONARCH 5-TON TRACTOR

A New Five-Ton Tractor

The new 5-ton Monarch Model G tractor made by the Monarch Tractor Corporation, Springfield, Ill., has a draw-bar capacity of fully 30 horsepower; its full five tons weight enables this power to be effectively employed; and the truck members have the proper oscillation and flexibility to provide adequate traction in the widest variety of field conditions. The tractor is of compact construction, has a low center of gravity to permit working in narrow quarters and on steep grades, is of simple design, easily lubricated, has full protection against the entrance of dust and dirt, is streered readily, and has rugged durability. These are the features mentioned by the manufacturers in placing this new model on the market.

The general dimensions of this Monarch tractor are: length, 10 feet over all; width, 6 feet 2 inches over all; height, without top, 5 feet 6 inches; length of ground contact, 5 feet 6 inches; and ground clearance, 1 foot, 3 inches. It has three speeds forward and one reverse, the forward speeds being 1.75, 2.34, and 3.75 miles per hour, and the reverse 1.5 miles per hour. Steering is accomplished through friction brake drums located at the ends of the differential shaft at each side. By means of the steering wheel convenient to the

Even in the north, construction work put under contract now continues in large volume throughout the year. In the dead of winter awards are two-thirds as great as at the spring peak. The high fall awards are strong evidence that winter construction pays, as they must largely represent work to be carried on through the cold months.



No Need to Wait Until Spring

BUILDING construction is now carried on throughout the winter as successfully as in any other season.

Think what the quicker occupancy of these winter-built structures means to their owners! If you need a new building, don't wait until spring. Start plans now for winter construction.

And use concrete for speed and economy. It will pay you.

Write nearest office listed below for booklets on "Winter Construction." There is no obligation

PORTLAND CEMENT ASSOCIATION

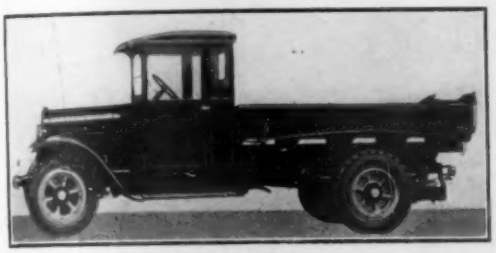
A National Organization to Improve and Extend the Uses of Concrete

Atlanta	Denver	Lincoln, Nebr.	Oklahoma City	Salt Lake City
Birmingham	Des Moines	Los Angeles	Parkersburg	San Francisco
Boston	Detroit	Milwaukee	Philadelphia	Seattle
Chicago	Indianapolis	Minneapolis	Pittsburgh	St. Louis
Columbus	Jacksonville	Nashville	Portland, Oreg.	Vancouver, B. C.
Dallas	Kansas City	New Orleans	Richmond, Va.	Washington, D. C.
		New York		

operator's seat, contracting bands 3½ inches wide operate on the brake drums, which are 16 inches in diameter.

Each track comprises 20 links or shoes, each 12 inches wide. On the inner or upper side of the shoe two low rails are cast integral and the truck wheels roll smoothly along the rails. The inner edge of the rail is rounded so as to give a smooth rolling action to the truck wheels. Near each end of the inner or upper surface of the shoe are cast two lugs of special design forming a driving contact with the staggered teeth of the driving sprocket. As the track is carried forward one section at a time the teeth in the front sprocket engage with the lugs on the track shoes. With the tracks thus firmly held, the truck wheels stay on the rails under all conditions. The shoe has a smooth ground-contact. Detachable grousers may be fitted for extreme conditions in mud, snow or ice.

The tractor is equipped with a road-makers' top designed for the attachment of full glass winter enclosure or curtains as desired.



THE NEW GRAHAM TWO-TON TRUCK EQUIPPED WITH DUMP BODY

A New Two-Ton Truck for City Work

The latest additions to the line of trucks made by Graham Brothers, Detroit, Mich., are two new types of two-ton capacities. Only two lengths are being made, the shorter, for 9-foot bodies, has a wheelbase of 137 inches, and the longer, which is for 12-foot bodies, has a wheelbase of 162 inches. Both chassis are equipped only with pneumatic tires with the option of either single or dual rears. Where single tires are used the 32 x 6-inch size are fitted in front and 34 x 7-inch at the rear. For dual rear-tire equipment disc wheels are standard, with 34 x 5-inch tires both front and rear.

The pressed-steel frame side rails for the shorter chassis are 7 inches deep and for the larger 7⅛ inches. Because of the lower bending moments in the short frame its thickness is 3/16-inch, while that of the longer frame is ¼-inch. Front springs on both chassis are 37 inches long, 2 inches wide and have 9 leaves, while the rear springs are 56 inches long, 3 inches wide and have 11 leaves. The semi-floating rear axles employ a spiral bevel-gear final drive with a reduction of 6.286 to 1. Both service and hand brakes are of the internal self-aligning type operating in heavy pressed-steel drums at the rear hub. The brakes are so connected that the pedal operates all four bands while the brake lever actuates only two.

The power unit consists of the Dodge Brothers 4-cylinder engine that is used on all Graham trucks and motor coaches, with a heavy-duty truck type transmission. The heavier frame, springs and other chassis parts are made to insure service with two-ton loads.

New Ahrens-Fox Representative

The Ahrens-Fox Fire Engine Company, Cincinnati, Ohio, has announced the appointment of the A. G. Long Company, Inc., Portland, Ore., as its authorized sales and service representative for the states of Oregon, Washington, and Idaho, and the territory of Alaska.

New Street-Lighting Units for Chicago

With the addition of seven thousand more ornamental Novalux street-lighting units made by the General Electric Company, Schenectady, N. Y., which will be in operation by December 15 of this year, Chicago will have the largest installation of modern residential incandescent street lights of one type of any city in the country. Three previous orders for a total of 15,500 units have already been installed, which will make a total of 22,500 lights, sufficient to illuminate more than 500 miles of streets. These lighting units consist of 250-candle-power Mazda lamps mounted on 12-foot concrete octagonal poles manufactured by the Chicago Concrete Post Company, Lawrence Lamon, and Leland Avenues, Chicago, Ill.

A New Coaster for Playgrounds

The Dow Roller-Koaster is a new, simple slide developed for playgrounds by the Logan Company, Inc., 1025-1051 Franklin Street, Louisville, Ky. This coaster consists of a frame of solid steel angles between which are mounted solid brass tube rollers with ball bearings. The slide is set at only a 25-degree pitch, while the usual slide is set at 45 degrees. This makes the slide safer, as the children do not have to climb to as great a height to reach the high end of the Koaster. At the same time, the children get up to the same speed by the time they reach the end of the slide, and it is possible for 50 per cent more children to use this than other types.

The ball-bearing rollers eliminate friction and consequently cause less wear on clothing. The rollers have a busy hum as the youngsters coast down the slide, making the Koaster even more attractive. The height to the top of the slide is 6 feet. The height to the top of the hand rails is 7 feet 10 inches. The length is 20 feet and the shipping weight only 580 pounds.

THE ROLLER-KOASTER IN USE

Immovable

Maximum density and high beam strength of base slab—secured by vibration

The finished street

Interlocking Bituminous Pavements

The recognized ideal in pavement construction—a dense concrete base interlocked with an immovable bituminous surface—is secured in INTERLOCKING BITUMINOUS PAVEMENTS.

By means of the interlocking corrugations the bituminous top and concrete base are securely "Interlocked." Rolling, creeping and shoving of the Bituminous Surface are completely eliminated.

While forming the Interlocking Corrugations, the Vibrators, *in the same operation*, produce the densest concrete base known, eliminating moisture film between base and top.

1500 pressure impulses a minute—each downward impulse equal to a 700-pound blow—eliminate all air and excess water from the base slab.

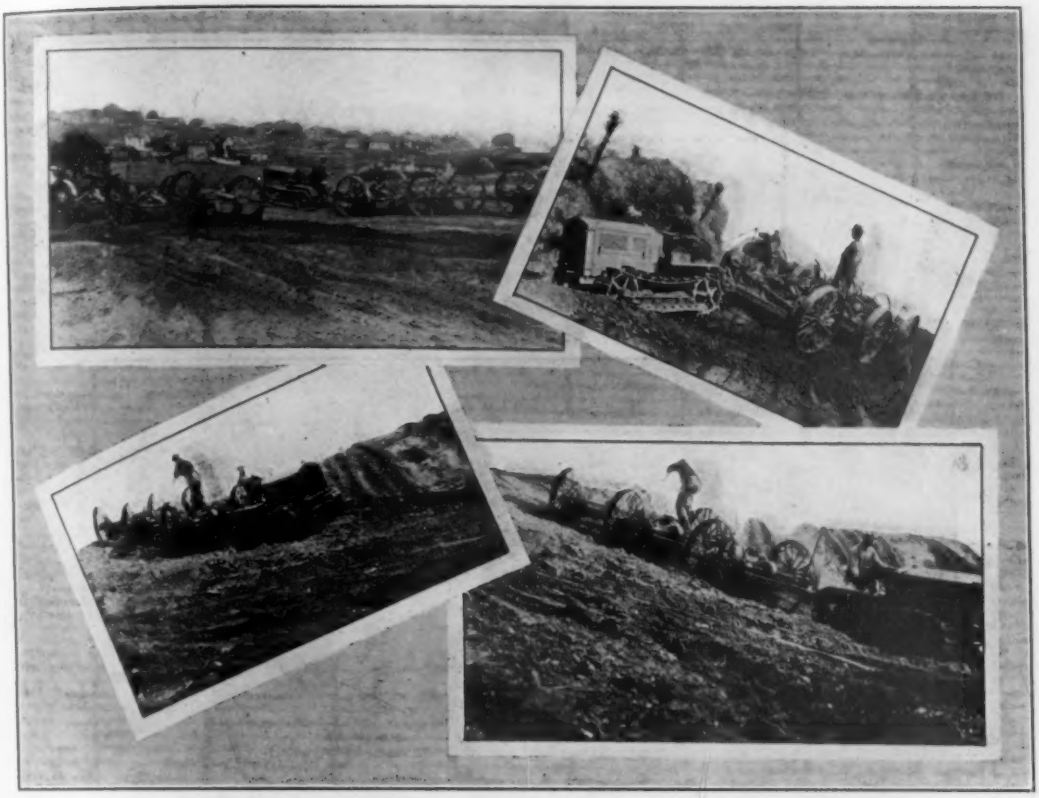
High beam strength and maximum density result.

Write for Booklet A-10

American Vibrolithic Corporation

INSURANCE EXCHANGE BUILDING DES MOINES, IOWA

SALES OFFICES IN 23 OTHER CITIES



TYPICAL SCENES ON THE GRADING OF THE AKRON SCHOOL STADIUM SITE

Earth Moving on the New Akron High School Stadium Job

In building the stadium for the new high school at Akron, Ohio, it was found that the most suitable site involved a 90,000-yard earth moving job. George Worley was awarded the contract and arranged to move the earth with six Cletracs and eighteen Hadfield-Penfield Du Pat wheel scrapers of one-yard capacity each. This equipment was put on the job and immediately attracted attention because of the speed with which it operated. Three of the wheel scrapers were attached to each tractor. The fleet regularly handled 1,800 to 2,000 cubic yards every 24 hours. The average length of haul is 1,500 feet.

In loading the tandem hitch the lead scraper is loaded first, the second next, and the third last, and they are dumped in the same way. The fill is abrupt and necessitates dumping the scrapers over the bank, which has been done without difficulty. The Akron stadium is to be one of the features of the new high school and is located near Goodyear Hall.

The Cletracs are the product of the Cleveland Tractor Company, Cleveland, Ohio, and the Du Pat wheel scrapers are made by the Hadfield-Penfield Company, Bucyrus, Ohio.

Asphalt Paving Congress

The Fifth Annual Asphalt Paving Congress under the auspices of the Asphalt Association, will be held November 8-12, 1926, at the Mayflower Hotel, Washington, D. C. This meeting will be held in conjunction with the annual meeting of the American Society for Municipal Improvements and the second annual meeting of the Association of Asphalt Technologists.

Fitchburg, Mass., Installs New Police Signal System

After having been for five years without a police signal system, during which time it was necessary to send out the patrol wagon to the policemen when orders were issued, the Fitchburg, Mass., Police Department has recently placed in service a new police signaling system made by the Gamewell Company, Newton Upper Falls, Mass.

The new system is entirely modern, with all cables placed underground. The equipment consists of one five-circuit, Type B, police desk equipped with five patrol panels, one primary flashlight panel of two circuits, one secondary flashlight panel with three circuits, one chief's panel, two test panels, one charging panel, one five-circuit Nonpareil register, one Excelsior time-stamp, one clock, one flashlight transmitter and one desk-phone set, eighteen standard police boxes with citizens' trap lock, and twelve 8-inch flashlights with fresnal lenses and metal shades.

The electrical energy for the operation of this system is furnished by 112 cells of F.I.P. battery mounted on a 60-inch four-shelf metal battery rack. A motor generator set takes care of the battery charging requirements.

DETROIT, MICHIGAN

ADOPTS

BUTLER VACUUM STREET SWEEPER

DUSTLESS ECONOMICAL SANITARY

See the Butler in operation in

New York; Chicago; Cleveland; Detroit; Portland, Maine; Duquesne, Pa.; Durham, N. C.; Cleveland Heights, Ohio; Asbury Park, New Jersey.

The Butler gets all the fine dust as well as the heavy debris—something no other device will do. It will save its cost in a few months' operation. Sweeps the gutter without separate attachment. Does not use water.

Investigate-Write

THE BUTLER MANUFACTURING CO.

MECHANICAL SWEEPING DEVICES

GENERAL OFFICE: HANNA BLDG. PLANT: 1810 E. 24th ST., CLEVELAND, O.

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New York City	**Chicago**	**San Francisco**
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An Effective Snow Fence to Prevent Drifts

Public sentiment demands that our highways be kept open for travel every day of the year. The people of this country have become so dependent upon the automobile and the truck as a means of moving merchandise, materials, and supplies that they will not tolerate the tying up of traffic by snow-filled highways. For this reason highway officials in all of the northern states are interested not only in appliances for opening snow-filled roads, but in equipment that will prevent highways from becoming filled with drifting snow.

Snow would not be so difficult to handle if it always lay exactly as it fell. It is drifting snow that causes the trouble, as deep drifts are not only difficult to get through, but expensive to move. The Good Roads snow fence, made by the Good Roads Machinery Company, Inc., Kennett Square, Pa., is an effective means of combating drifting. It is a combination of white cedar pickets interwoven with No. 12-gage double-strand wire. The wire is especially heat treated and extra-heavy galvanized, while the pockets are 2 inches wide, 1½ inches thick, and are spaced 2½ inches apart. This fence has no joints to rust and cannot be easily broken, nor can the pickets be torn out as each picket is supported at four or five places by from eight to ten wires.

The fence should be erected from 50 to 300 feet from the edge of the highway, depending on the grade and slope to the land. The posts to which the fence is attached can be of wood or of steel, according to which may be the more convenient to obtain. The posts should be set from 10 to 16 feet apart and about 2 feet deep. The end and corner posts should always be braced. The first two posts should be set near enough together to brace from the top of the end post to the bottom of the second. When the posts are set up some distance apart, a good solid stake driven between them to the height of the second wire will be found of advantage. The wire fence is unrolled on the ground alongside the posts. From 100 to 200 feet can be stretched at a single pull with a block and fall. It is easily put up or taken down and can be rolled up and stored away in a small space. Each roll of fencing as shipped from the factory contains 100 feet of fence and is not over 3 feet in diameter.

Sanitary Gymnasium Lockers

Gymnasium lockers are now being built in sections, with twelve lockers to the section, having a single door on the outside of each section. The doors open at the rear with a single latch control, making one lock do for the entire set of lockers. The lockers are being built by the Patterson-Williams Manufacturing Company, 551-557 West San Fernando Street, San Jose, Calif. The sections are put together in a rectangular form, with the space in the center for the supervisor or monitor. There is a door at one end of the rectangle for the supervisor's entrance. This has only one lock for the whole set, and the supervisor is the only one who has the key.

When a class comes in for gymnasium work, the supervisor releases the doors of the different sections assigned to that class, each class having its own sections. The gymnasium clothes are taken from the lockers and put on, and the street clothes are hung back in the locker on hooks provided for this purpose. When the last individual is through, the door is slammed shut and locks itself, and the sections are closed during the time the class is in the gymnasium room. When the gymnasium work is over, the class returns and the same sections are opened again, clothes changed, and the gymnasium clothes hung back in the locker. The door is then shut.

For after-class work when individuals come in for their suits, there is a wicket provided for passing out each suit, so that no section need be opened to anyone except in the class time. When

PICTORIAL PROOF THAT IT PAYS TO USE THE GOOD ROADS SNOW FENCE

The ability

to get the most out of equipment is the difference.....
between a large and small income.

WHETHER you are making box cars or digging ditches—that axiom holds true. Equipment must have capacity and versatility in performance the same as do men in order that they make their services valuable.

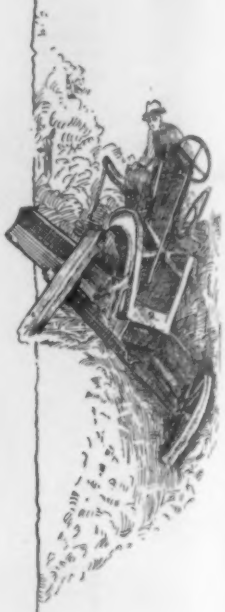
For building and maintaining roads, grading, scarifying, rooting, rolling, ditching and snow removal, the H-P "One Man" Grader speeds your work and saves in cost.

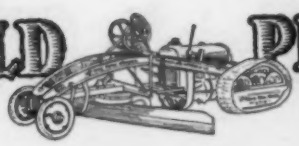
In other contract work, leveling, road patrol, back filling and other operations it is equally valuable. For use in parks, play grounds, estates and golf courses—its various attachments provide it with a versatility that makes it a real investment to contractors.

H. P. Rigid Rail Tracks and Cahl Tracks make crawlers of your tractor. Du Pat Scrapers speed and simplify earth moving. Winchell Rollers in various sizes.

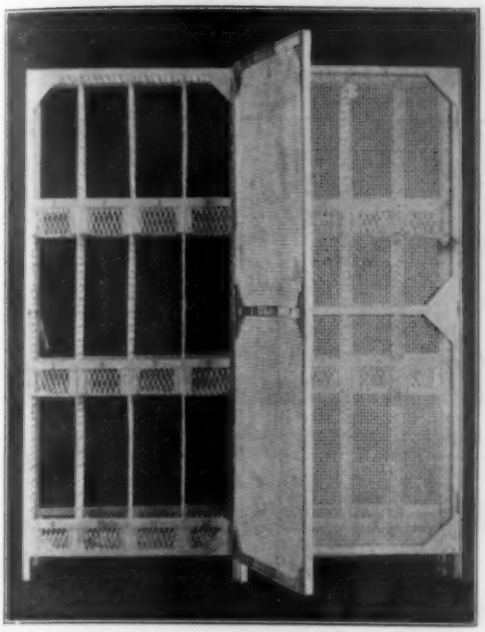
Our pamplet shows many interesting things that are to your advantage. Send for it.

Hadfield-Penfield Steel Co.
Bucyrus, Ohio



HADFIELD PENFIELD
ONE MAN  **GRADER**

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.



TWO SECTIONS OF THE NEW SANITARY GYMNASIUM LOCKERS

all the members of the class are there, no one can remove anything from another's locker without its being known. Because of the open construction of the locker, as seen from the illustration, it is impossible to hide anything which one individual may borrow from another.

The open construction allows clothes to dry and leaves the air in the room in good condition. Everything is in view and no one can get at any locker unless the supervisor or monitor is present. There is economy of space, which is quite an object in many cases. Clothes can be hung on hooks inside, keeping them in shape and still permitting circulation of air.

These lockers overcome the trouble now experienced in high schools from stealing. They also eliminate the inconvenience caused by the loss of keys for individual lockers.

How Moncton, N. B., Dug Out of Snow Last Winter

During the winter of 1925-26, after the heaviest snow storm of the year when drifts several feet deep tied up traffic, the city of Moncton, N. B., cleared all of its streets of snow with a Wehr grader equipped with Trackson Full-Crawlers. This equipment worked 24 hours a day for 12 days without a rest or breakdown. According to J. B. MacBeath, City Engineer, this grader replaced five teams. Three operators were necessary for the grader's long working day. Although the snow often went over the top of the machine, it plowed through. The operators made a complete round of the city exclusive of two streets in 8 hours and they continued this three times a day.

The grader worked where it would have been impossible for horses to work even under ordinary conditions. The crawler tracks gave the grader sure footing and it worked without loss of power. The grader worked on the full range of speeds offered by the Fordson—from 2 to 7 miles per hour.

On the first trip around, the grader cut a lane through the snow wide enough to permit cars to pass through, thus relieving congestion. On subsequent trips with the equipment the lanes were widened. When the snow began to fall the grader was put on the job, and it was kept at it until the full width of the roads was clear at the end of the storm and until after drifting had stopped. During the spring, summer, and fall, the city uses this equipment for road construction and maintenance, reporting that its economical fuel consumption, long wearing qualities, and speed make it a particularly desirable unit for this work.

The Wehr one-man grader is made by the Wehr Company, Milwaukee, Wis. The Trackson Full-Crawler equipment is manufactured by the Full Crawler Company, 517 Clinton Street, Milwaukee, Wis.

Noonan New District Manager for Badger Meter

The Badger Meter Manufacturing Company, Milwaukee, Wis., has announced the appointment of Daniel F. Noonan as Assistant Sales Manager for the states of Pennsylvania, Maryland, Delaware, Virginia, and West Virginia. Mr. Noonan formerly represented the Pittsburgh Meter Company in this same territory.

New Paradon Appointment

The Paradon Engineering Company, 24 South Washington Place, Long Island City, N. Y., has announced the appointment of Ellis K. Phelps, formerly of Wallace & Tiernan Company, as its representative in charge of sales and the service of Paradon chlorinators in the New England states and in the state of New Jersey.

WEHR GRADER EQUIPPED WITH TRACKSON FULL-CRAWLERS CLEARING THE STREETS OF MONCTON, N. B., LAST WINTER

Water Purification Plant, Springfield, Illinois. Burns and McDonnell, Kansas City, Engineers; Cope and Fisher, Springfield, Contractors. Three per cent of Celite was used here in concrete of 1:2:4 mix.

CELITE

Insures Better Concrete at Less Cost

Not a Substitute for Portland Cement

The admixture Celite does not displace Portland cement in a concrete mixture. It is simply an additional dry ingredient of the mix which increases workability to a degree that cannot be duplicated, either by the use of excess mixing water, of increased quantities of cement or of any other type of admixture.

Only small quantities, proportionally, are required. Two to six per cent as much as the Portland cement content of a mixture (by weight) is ordinarily employed, depending on the mix and the character of the aggregates.

It first functions in the mixing drum, where its "lubricating" properties contribute to more thorough mixing. During chuting or gunning, or in long hauls from a central mixing plant, it prevents segregation, keeping every particle of Portland cement, sand and coarse aggregate in exactly the same relationship as when the mass left the mixer.

In the placing of the concrete, especially when intricate forms are cluttered with re-inforcing rods and conduits, it saves labor and manipulation again through improved workability. Even when so harsh an aggregate as slag is used, Celite will overcome harshness in the mixture, without the use of excess water.

Thousands of tons of this siliceous powder have been employed throughout the country, in concrete construction of every type. It carries the endorsement of many prominent engineers and architects.

CELITE PRODUCTS COMPANY

NEW YORK 11 BROADWAY · CHICAGO 53 W. JACKSON BLVD.
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CELITE PRODUCTS LIMITED, NEW BIRKS BUILDING, MONTREAL · QUEBEC
CELITE PRODUCTS CORPORATION, 147 WINDSOR HOUSE WESTMINSTER, LONDON ENGLAND

Special Insulated Asphalt Dump Body mounted with the Heil Hydro Hoist on the Sterling Truck.

Cut Hauling Costs With Heil Dumps

Whether it's hauling hot asphalt, ashes, rubbish, garbage, sand and gravel, or cinders, you will always find a Heil Steel Dump Body and Hydro Hoist especially adapted to do the job. Steel Dump Bodies "Made by Heil" are built the way you want them. Select the one for your City from our Catalog No. 140 and Bulletin No. 146.

Heil Hydro Hoists mount with Heil Bodies on any make or model motor truck. The hoist with TWIN cylinders and TWICE the power. Ask about the standardized Heil Ford Line of Municipal Equipment—Bodies, Hoists, Tanks and Street Sprinklers—Bulletin 150.

THE HEIL CO.

1242-60 26th Avenue, Milwaukee, Wis.

One of our Twenty-five Distributors is near you!

Three of the five Heil-equipped dump trucks recently added to the City of Syracuse, N. Y., fleet and used in garbage and rubbish collection work.

DIFFICULT WORK WITH A GALION GRADER ON A SHARP CURVE ON THE WAY TO THE MT. WILSON OBSERVATORY

Maintaining the Toll Road on Mount Wilson, Pasadena, Calif.

The toll road leading up to the great astronomical observatory on Mount Wilson, near Pasadena, Calif., is of typical mountain construction, winding about the side of the mountain and needing constant maintenance. Material from above works down into the road and the gradients from 5 to 20 per cent enter as factors in the displacement of road materials through washing and the natural action of gravity.

In road maintenance, fully as much as in any other activity, "a stitch in time saves nine" and the engineer in charge of this road believes in constant attention. With sharp curves, narrow ledges, and steep gradient, horse- or engine-drawn maintainers did not prove efficient. The work is now being handled economically by the use of a Galion-Fordson one-man grader equipped with crawlers. This machine is sturdy enough and powerful enough to move considerable masses of material and smooth it into shape. Its main work, however, is the continuous patrol of the road, filling ruts and preserving it in the best condition possible.

According to the Galion Iron Works & Manufacturing Company, Galion, Ohio, the expense involved in maintaining this grader is comparatively small. It takes only one man's time and the gasoline and oil used by the Fordson. When the machine is not in use there is no expense for food and attention, as when horses are the motive power, and it is always ready to start at a moment's notice. The one man operating the machine does not find the labor heavy. He is comfortably and safely seated with the controls within easy reach. The 40-inch lift-wheels with cut-steel worm gears running in oil in the enclosed gear case makes the work of lifting the blades comparatively easy. The position of the operator on this machine—in full view of the blade work and the road ahead at the same time—is of special value on the Mount Wilson road where short turns and dangerous conditions make this especially desirable.

SMOOTHING OUT THE RUTS ON THE MT. WILSON ROAD

Consolidation in the Water-Works Field

The recent merger of the United States Brass Manufacturing Company, of Cleveland, Ohio, and the Oberndorf Manufacturing Company, of Pittsburgh, Pa., to form the United-Oberndorf Corporation, Cleveland, Ohio, has led to the enlarging of the manufacturing facilities at Cleveland. Moving of the Oberndorf Division of the newly formed corporation to Cleveland took place in September. The corporation's present address is 3844-3862 Hamilton Avenue, Cleveland.

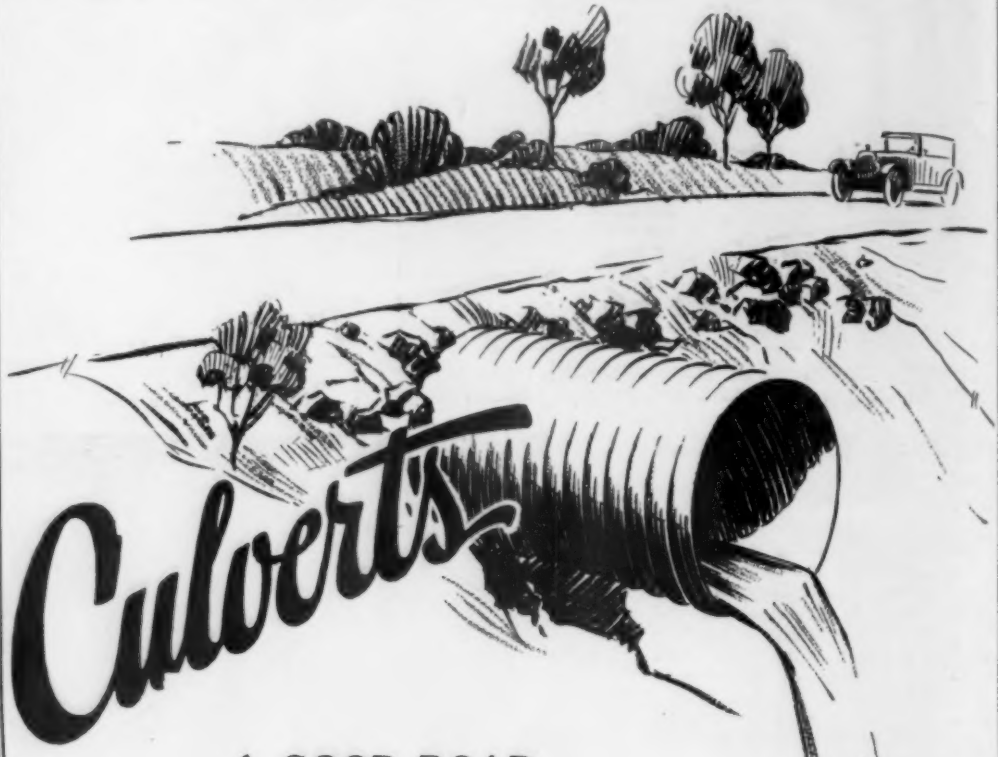
The officers of the new corporation are E. M. Rogert, President (formerly General Manager of the United Brass Manufacturing Company); W. J. Oberndorf, Vice-President and Treasurer (formerly President of the Oberndorf Manufacturing Company); and A. E. Edwards, Secretary and Factory Manager.

This company manufactures a complete line of brass plumbing and water-works goods.

Combination Welder and Air-Compressor

A combination air-compressor and arc welder driven by a gas engine and mounted on a single base has been placed on the market by Schram, Inc., West Chester, Pa. The outfit consists of a Buda gasoline engine, a Schramm compressor, and a General Electric welding outfit. The complete equipment may be mounted on a standard 2-ton truck, or can be made portable by adding steel- or rubber-tired wheels.

The Buda engine is a 24-horsepower, 800-r.p.m. unit which may be started and operated independently of either the compressor or the welding generator. The Schramm compressor is a two-cylinder water-cooled machine with a capacity of 120 cubic feet per minute, and is equipped with an automatic unloading device. The air receiver is 60 inches in diameter by 42 inches high. The General Electric welding equipment consists of a belt-driven WD-12 arc welder with an idler pulley for belt tightening. By the use of a Borg



A GOOD ROAD

A good road that doesn't stay good is usually so because of the culvert under it. Monolithic or Masonry Culverts will crack due to uneven settling of fills, vibrations or other causes and these cracks gradually become more pronounced causing a sinking of the road directly over it. Compare this condition with the smooth roads that have

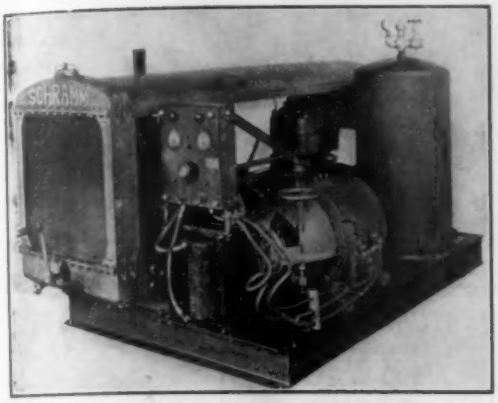
Newport Corrugated Culverts

under them. Installations made more than a decade ago show little or no signs of depreciation. Proving their superiority—economy—and Resistance to the elements, Vibrations and tremendous pressures.

NEWPORT CULVERTS ARE EASILY INSTALLED BY UNSKILLED LABOR

THE NEWPORT CULVERT CO
Newport, Kentucky

Write for descriptive literature and further data.



COMBINED PORTABLE ARC WELDER AND AIR-COMPRESSOR OPERATED BY GASOLINE ENGINE

& Beck 12-inch clutch coupling, either of the machines may be connected to the engine.

This combination outfit will undoubtedly be of great value in field work, as the air-compressor can be used to operate drills, grinders, and chipping hammers for cutting, peening, calking, and cleaning off scale. The compressor can also be used in preparing work for welding. With the G. E. WD-12 welder, light- and heavy-gage steel can be welded. After the welding is completed, the compressor clutch is thrown and the weld can be ground or chipped as desired; thus a complete job can be done with the single machine.

The structural steel base is 8 feet 4 inches long and 5 feet 11 inches wide. The outfit is 3 feet 10 inches high and weighs approximately 4,000 pounds.

A New Snow-Plow for Medium-Weight Tractors

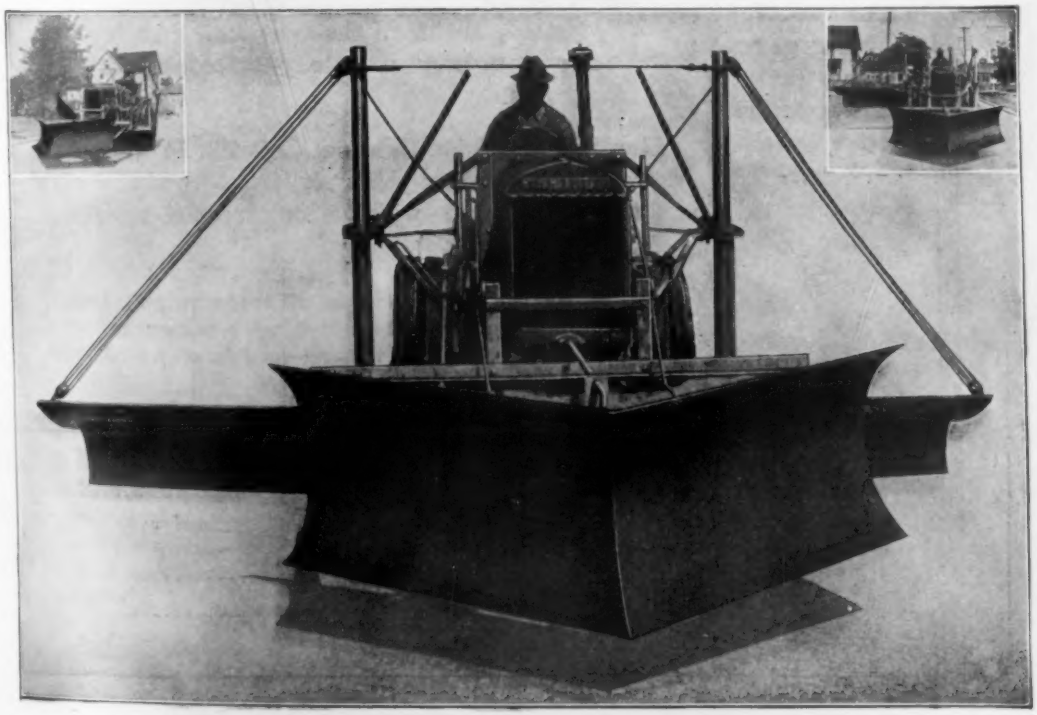
The Acme snow plow attachment has been designed by the Acme Road Machinery Company, Frankfort, N. Y., to meet with the need and demand for a light, powerful, snow handler to fit between the truck plow and the heavy tractor equipment. This has been accomplished by combining a McCormick-Deering tractor with a rigid steel frame to which the snow-moving elements are attached. The tractor furnishes the propelling power and the steel frame relieves the tractor unit of every possible injurious stress.

The snow plow is made up of a V-plow which is carried high in front to clear the way for the machine, and side adjustable wings which make it possible to clean the highways the full width in a light snow. The snow wings are provided to roll and carry the snow over to the sides and also to cut down the height of the sides to permit piling of additional snow and also to reduce drifting.

A low center of gravity is maintained and the weight is so divided between the front and rear that maximum traction is balanced against steering requirements. That is, there is sufficient weight on the front wheels to prevent slewing and to enable the operator to maintain any desired line of operation.

The machine is equipped with a scarifier at the rear, which can be used for breaking-up the ice on roads. The ice can later be scraped to the side of the road by use of the adjustable wings.

An independent rear axle mounted on Hyatt roller bearings and geared to the power unit in a ratio of three to one, permits a combination of large diameter wheels, greater power and a standard locking device by means of which both drive wheels may be locked to the rear axle for a combined pull when desired.



THE NEW ACME SNOW-PLOW, SHOWING VARIOUS SETTINGS OF THE WINGS

Patch concrete roads quickly — cure with SOLVAY

A typical patching job with Solvay.

TRAFFIC conditions frequently require rapid curing of many small sections of concrete to repair quickly the pavement surfaces and avoid long detours.

The use of Solvay Flake Calcium Chloride as an admixture will insure rapid and satisfactory curing of the concrete. Heavy traffic can pass over a Solvay-treated patch in a few hours.

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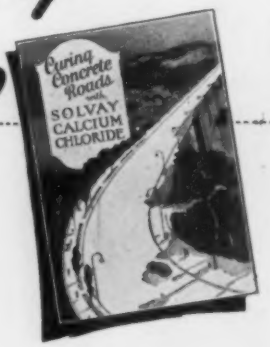

Complete specifications for all concrete curing, both surface and integral methods, are in the new Solvay booklet—it's free on request—send the coupon NOW!

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WING & EVANS, Inc., Sales Dept. **40 Rector Street, New York**

Please send me booklet No. 1051 and quote price, and nearest shipping point—no obligation of course.

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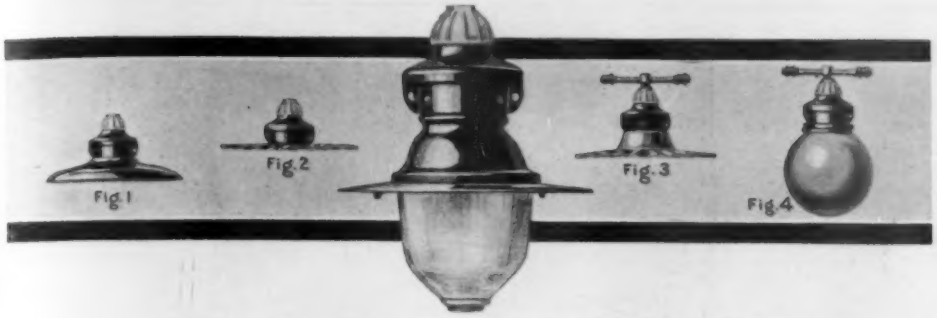


SEVERAL ADAPTATIONS OF THE LINE UNIVERSAL FIXTURE

A New Street-Lighting Fixture

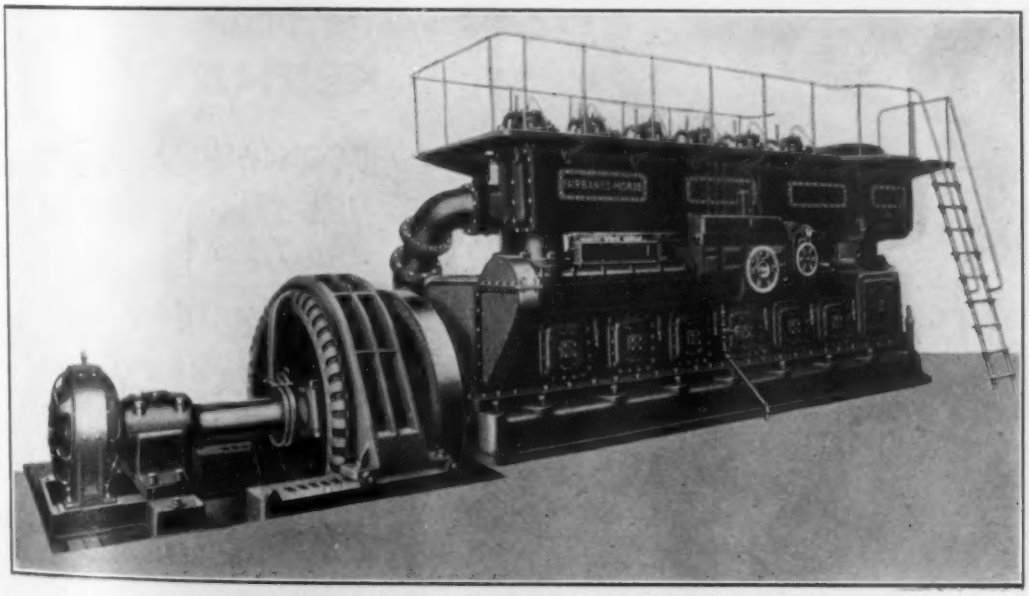
A Universal fixture has been developed by the Line Material Company, South Milwaukee, Wis., for street-lighting service. This fixture will accommodate not only equipment made by this company but that of other manufacturers also. The cast-iron canopy which is either painted or galvanized is tapped so that the fixture may be screwed directly onto a gooseneck or used with any suspension fitting. When used on a bracket, a cross-arm is screwed onto the fixture. The body is a heavy piece of brown glazed porcelain affording sufficient insulation. The leads may be tied through the holes in the porcelain ears or the fixtures can be inner-wired through the canopy. The center illustration shows the fixture equipped with a one-piece 18-gage aluminum reflector which fits snugly into the porcelain head. Besides this, the Universal fixture will take a regular bowl reflector, as shown in Figure 1, a radial wave reflector, as shown in Figure 2, or a radial bowl reflector, as shown in Figure 3. The aluminum reflector is equipped with a refractor holder to hold an 8-inch Holophane open-bowl refractor, as illustrated. A bronze latch holds the refractor ring, which is hinged, allowing the refractor to be easily cleaned.

Figue 4 shows this fixture equipped with a spherical globe. The globe holder is leak-proof, which allows the fixture to be inverted above the bracket. This fixture is extensively used with red globes, to indicate fire alarms. There are 96 different combinations of this Universal fixture.

Fairbanks-Morse Building Larger Diesel Engines

The recent announcement by Fairbanks, Morse & Co., Chicago, Ill., of a line of diesel engines in ratings of 480, 600 and 720 horsepower, has created considerable interest among the users of diesel engines. Some twelve of the 720-horsepower units have already gone into service. The larger diesels are of the two-cycle, single-acting, port-scavenging, airless-injection type. With these fundamental principles a number of interesting features have been incorporated, such as two-stage combustion, pressure lubricating system throughout, reversible and centralized control, and a built-in scavenging pump.

The two-stage combustion principle involves spraying the fuel into a combustion chamber located at the top of the cylinder. The timing of the injection is such that the flow of air from the



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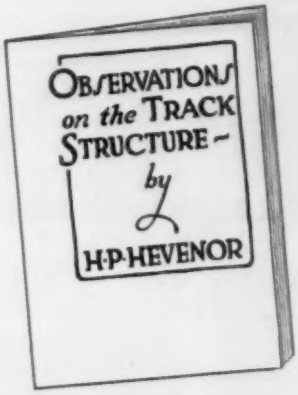

A Consulting Engineer on Paved Track in City Streets—

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cylinder up through the neck of the combustion chamber space meets the injected fuel, causing a considerable turbulence and an intimate mixture of the fuel and air. The velocity of the fuel from the injection nozzle at the top of the combustion chamber and the velocity of the air entering into the combustion chamber are practically the same, so that the fuel is not blown back against the surface of the combustion chamber before combustion begins. This intimate mingling of air and fuel takes place just at the instant of the maximum compression of 500 pounds, and as the temperature at this compression is approximately 1000 degrees Fahrenheit, the fuel charge ignites and slow combustion begins. Because there is not sufficient oxygen in this combustion chamber for complete combustion, the fuel charge burns to carbon monoxide.

As the piston recedes on the downward stroke with the attendant rush of gases through the neck into the cylinder space, a further turbulence is created and a thorough mixing of the excess air with the CO_2 gas and remaining oil vapor is brought about, and the final combustion of the charge to carbon dioxide gas is completed.

Complete control of the engine is centered in a compact and accessible unit located at the center of the engine and housing the injection pumps and air starting mechanism. A governor unit is mounted alongside the injection and air starting unit, thus centralizing the complete control system. The larger hand wheel is used in starting the engine. When this hand wheel is thrown to the start position, compressed air at about 250 pounds pressure is admitted to the cylinders in proper order, so that the engine begins to turn over. The hand wheel is then thrown to the run position and firing commences.

Speed control is taken care of by a smaller hand wheel located on the governor, which changes the setting of the governor spring. An indicating pointer just above the rim of this hand wheel shows whether the change in speed is slower or faster. This speed control is used when paralleling two or more diesel-electric generating sets, or it may be used for drives requiring speed variations.

One of the outstanding features of the new design is in the way the pressure lubricating system and the arrangement for piston cooling have been worked out. A rotary oil pump drains the oil from a main storage tank and forces it through a duplex strainer and then through a cooler into the header in the lower base of the engine. The oil enters the header under pressure and is distributed by branch lines to all main bearings. Circulation grooves in the main bearings register with holes in the crankshaft, permitting the major part of the oil to pass through the crankshaft to the crankpin bearing. In the same manner circulation grooves in the crankpin bearings register with holes in the crankpin, allowing the oil to flow continuously from pin to groove. These grooves in turn connect with holes in the upper half of the crankpin bearing and hollow connecting rod. The piston pin is oiled through the piston pin bearing.

A Crosswalk Snow-Plow and Backfiller

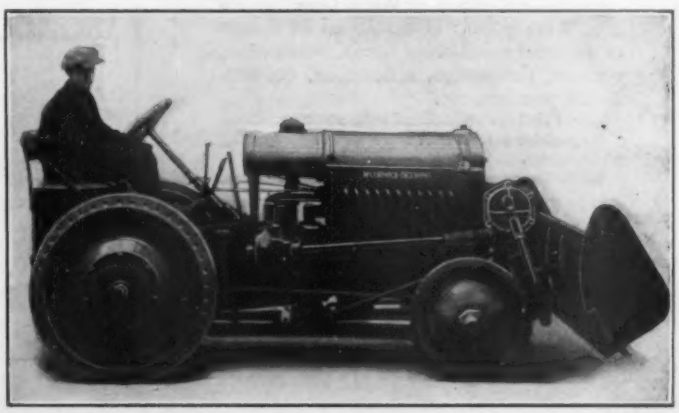
In cities and towns after the highways have been cleared for wheeled traffic and the snow rolled back into piles along the curb, there still remains the task of opening footpaths at street intersections. The Good Roads crosswalk snow-plow No. 23, made by the Good Roads Machinery Company, Kennett Square, Pa., has been designed especially to meet this need. In districts where the policy is to remove snow entirely from the streets, this plow is of great value as a backfiller with which to roll the snow into sewer inlets. Its effectiveness as a backfiller also gives it all-year-round usefulness, as it works equally well on dirt in excavation jobs.

This new plow is used with a McCormick-Deering 10-20 tractor made by the International Harvester Company, 606 South Michigan Avenue, Chicago, Ill. The blade and moldboard of the plow are set rigidly in position at right angles to the axis of the tractor. The moldboard clearance is varied by lengthening or shortening the lift struts. Driven directly at the heaped-up snow, the plow rolls back the mass, making a clear path for pedestrians.

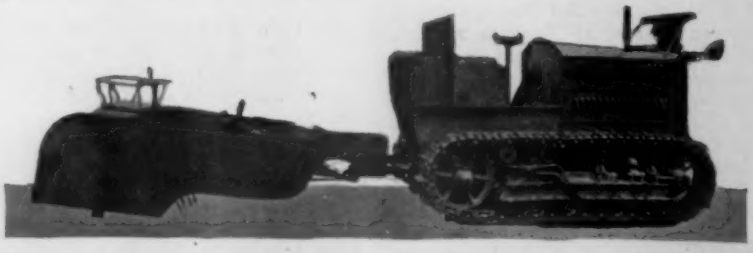
The lift is operated by power, with the controls conveniently located at the driver's hand. Compactness of design gives the driver an unobstructed view of the ground ahead and on all sides.

Another feature of the lift device is the safety arrangement which makes it impossible to damage the mechanism by lifting it too far. Should the operator forget to let go the clutch lever, the blade will rise to its maximum height and start down again. This will repeat until the operator releases the clutch lever. As soon as the clutch lever is released, the moldboard is locked at that height, and it will remain at that height, regardless of load, until the operator again touches the lever. The blade may be raised or lowered with equal ease while pushing a full load.

A double spring release device is used to insure proper action when working in dirt or piled and frozen snow. This automatic blade release is so designed as to function properly even in case of spring breakage. The moldboard, which has a renewable edge of high-carbon steel, is attached to a framework of 3 x 3 x ½-inch structural angles which attaches directly to the rear axle of the tractor.



THE GOOD ROADS CROSSWALK SNOW-PLOW AND BACKFILLER



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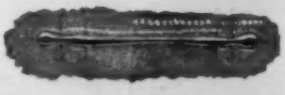

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